Examining the Adoption and Use of Mobile Data Services: A Consumer Behavior Analysis

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Examining the Adoption and Use of Mobile Data Services:

A Consumer Behavior Analysis

A thesis submitted in partial fulfillment of the requirement for the degree

Of

Doctor of Philosophy

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This thesis has been submitted for assessment in partial fulfillment of the PhD degree. The thesis is based on the submitted or published scientific papers which are listed above. Parts of the papers are used directly or indirectly in the extended summary of the thesis. As part of the assessment, co-author statements have been made available to the assessment committee and are also available at the Faculty. The thesis is not in its present form acceptable for open publication but only in limited and closed circulation as copyright may not be ensured.

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Abstract

The increasing penetration of mobile phones and mobile services even in poorer communities in the developing world (where the number of mobile phones has exceeded that of bank accounts) has led to an ever-larger number of services aimed at providing development in various sectors of the economies of the developing countries. Recent studies have shown the rise in the use of mobile applications to leapfrog the developmental agenda of many developing countries. This is because of continuous improvements in mobile technologies, increased affordability and availability. One of such mobile services developed to bring financial services to the rural unbanked is referred to as mobile money. However, the consumer acceptance and use of the technology has been varied in different countries with similar socio- economic factors. Whereas, the implementation of mobile money (M-PESA) was successful in Kenya, the same implementation in Tanzania did not attract large acceptance. The interaction between consumers and technology takes place within a social environment where existing social practices, norms and cultures exist. The aim of this research is to examine how these environmental factors interact with the technological and individual characteristics and determine the consumer's acceptance, use and adoption of the mobile data services. In addition, to provide a better understanding of the phenomenon that arises because of consumer interaction with the mobile money services.

To explore this phenomenon, this thesis views technology adoption as a process and applies different perspectives of the consumer's technology acceptance, use and adoption literature to examine how this new technology is adopted within a context which is perhaps hostile to alternative solutions which are taken for granted in the developed economies. It draws upon a mixture of quantitative and qualitative field studies and six research papers. To provide some explanation of the consumer decision-making process, this thesis applies triangulation perspective and integrates theories from consumer behavior, technology acceptance, diffusion of innovation and domestication streams of research. The findings indicate that aside the usual technology characteristics and individual characteristics, the individuals' social networks, social practices and private and symbolic meanings of the service affects the acceptance, use and adoption of the technology.

This thesis contributes to the understanding of mobile data services acceptance, use and the process by which consumers make the decision to adopt technology in their everyday life. It introduces an integrated mobile money adoption model (iMoMAM) which provides an understanding of consumers' socially influenced decision processes that guide the decision to adopt and use mobile money services. It also provides a new perspective to the determinants of end-user technology appropriation decision making. It was observed that an end-user's technology appropriation is determined by the public meaning of the technology; the end-user's private meaning and social influence. Furthermore, it provides some contextual information about how the technology is being incorporated into the everyday life of those who have adopted it.

Resumé

Selv blandt fattigere befolkningsgrupper i udviklingslandene, hvor antallet af mobiltelefoner har oversteget antallet af bankkonti, har den stigende udbredelse af mobiltelefoner og mobile serviceydelser ført til et stadig større antal serviceydelser, som har til mål at styrke udviklingen af forskellige sektorer af økonomierne i udviklingslandene. Nye studier har påvist fremvæksten i brugen af mobile applikationer med henblik på hurtigt at fremme udviklingsdagsordenen i mange udviklingslande. Dette skyldes de kontinuerlige forbedringer af mobile teknologier og den stigende prisbillighed og tilgængelighed. En af disse mobile serviceydelser kaldes 'mobile penge'. Den er udviklet for at stille finansielle ydelser til rådighed for de mennesker i landområderne, som ikke er bankkunder. Men forbrugeraccepten og brugen af teknologien varierer mellem forskellige lande med ensartede socio-økonomiske betingelser. Mens indførelsen af mobile penge (M-PESA) har været succesfuld i Kenya, har en lignende indførelse i Tanzania ikke ført til stor udbredelse. Interaktionen mellem brugere og teknologi finder sted under forskellige samfundsmæssige omstændigheder herunder den eksisterende sociale praksis, normer og kulturer. Målet med dette forskningsprojekt er at undersøge, hvordan disse samfundsmæssige omstændigheder interagerer med teknologiske og individuelle karakteristika og er afgørende for kundens accept, brug og adoption af mobile dataserviceydelser. Målet er endvidere at skabe en bedre indsigt i den situation, som opstår når kunden interagerer med serviceydelsen mobile penge.

For at undersøge dette fænomen ser denne PhD-tese teknologi-adoption som en proces og anvender forskellige perspektiver i den videnskabelige litteratur vedrørende kundens accept, brug og adoption af teknologi. Målet er at studere, hvordan denne nye teknologi adopteres i en kontekst, som måske modvirker alternative løsninger, som tages for givet i de økonomisk udviklede lande. Den bygger på både kvantitative og kvalitative studier i marken og omfatter 6 forskningspapirer. Med det mål at give en forklaring på forbrugernes beslutningsproces anvender denne tese et trianguleringsperspektiv og integrerer teorier vedrørende forbrugeradfærd, teknologi-accept, diffusion af innovation, og teknologitilegnelse (domestication). Resultaterne indikerer at - udover de almindelige teknologikarakteristika og individuelle karakteristika - påvirker individernes social netværk, deres sociale praksis og den personlige og symbolske mening, som kunderne tillægger teknologien, deres accept, brug og adoption af teknologien.

PhD-tesen bidrager til forståelsen af accepten af mobile dataydelser, brugen af ydelserne og den proces gennem hvilken forbrugerne træffer beslutning om at adoptere teknologien i deres hverdagsliv. Tesen introducerer en integreret model for adoption af mobile penge (iMoMAM). Denne model giver en forklaring på forbrugernes socialt influerede beslutningsproces, som styrer beslutningen om at bruge og adoptere mobile penge. Den fremlægger også et nyt perspektiv på de faktorer, som er bestemmende for slutbrugernes beslutning vedrørende teknologitilegnelse. Det er endvidere observeret, at en slutbrugers teknologitilegnelse er bestemt af den generelle mening som teknologien tillægges, slubrugerens egen forståelse af teknologien og den sociale indflydelse. Desuden fremlægger tesen kontekstuel information om hvordan teknologien inkorporeres i hverdagslivet af de, som har adopteret den pågældende teknologi.

Contents

Figures and Tables

FIGURES

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Abbreviations and Acronyms

1G	First generation mobile technology
2G	Second generation mobile technology
3G	Third generation mobile technology
4G	Fourth generation mobile technology
CD	Compact disc
CDMA	Code Division Multiple Access
CR	Critical realism
DOI	Diffusion of innovations
DSL	Digital subscriber line
GPRS	GSM Packet Radio Service
GSM	Global System for Mobile Communications
I&M	Information and Management
ICT	Information and Communication Technology
IEEE	Institute of Electrical and Electronics Engineers
IS	Information Systems
ISJ	Information Systems Journal
ISR	Information Systems Research
IT	Information Technology
ITC	Information technology continuance model
Mbit	Megabit
MISQ	MIS Quarterly
MP3	MPEG-1 or MPEG-2 Audio Layer III audio data compression encoding
MUG	Microsoft usability guidelines
PDA	Personal digital assistant
RQ	Research question
SIM	Subscriber identification module
SMS	Short Message Service (aka text messaging)
TAM	Technology acceptance model
TTF	Task-technology fit
UMTS	Universal Mobile Telecommunications System
USB	Universal Serial Bus
UTAUT	Unified theory of acceptance and use of technology
WAP	Wireless Application Protocol

1. Introduction

The dissertation argues that consumer adoption of mobile data services in voluntary settings should be considered as a process involving technology acceptance, use and adoption. This chapter aims to provide the motivations for the study, describe its background, and outline the statement of objectives, and research questions. First, introduce, as the Background to the research, the rapid growth of mobile technologies, which has occurred over the past two decades and has led to an increase in research on mobile applications for development. Followed by the research objectives discussed in line with the overall purpose of the study. The research question is then formulated, followed by an elaboration into four research sub-questions. Finally, we present the contributions and the overall structure of the thesis.

1.1. Research Background and Purpose

The purpose of this study is to examine the phenomenon that arises as the mobile money technology and people interact, with a particular interest in the consumer acceptance, use and adoption of the services. It seeks to demonstrate how a newer form of technology is adopted within a context, which is perhaps hostile to alternative solutions, which are taken for granted in developed economies. Thus, the overall objective of this study is to examine the phenomenon of mobile money, its acceptance, use and adoption. One of the primary features of the mobile money application is its ability to "bank the unbanked".

The adoption and use of mobile cellular technologies has been recorded in literature as the most rapid expansion of consumer-level technology in history (Jack & Suri, 2011; Mbiti & Weil, 2011). With the current 5.9 billion mobile cellular subscriptions, the global penetration reaches a staggering 87% in general and 79% in the developing world (ITU, 2011a). In the last two decades, the establishment of the global system for mobile communication (GSM) and code division multiple access (CDMA) technologies, has led to a tremendous growth in the mobile telecommunication market. This rapid progress could be partly attributed to the human, social need for interaction fulfilled by the mobile phone. In addition, partly due to reduced communication costs in many parts of the developing world. Fixed telephones have offered many of the same benefits for decades (R. J. Saunders, Warford, Wellenius, & Bank, 1983), but in many cases have been too expensive or simply unavailable to the rural dwellers that make a greater percentage of people living in

developing countries. The advances in mobile technology coupled with changes in business models by mobile network operators have enabled the poorest countries to improve their telecommunication network coverage to the majority of its citizens including the rural poor (Duncombe, 2010). As a result of the influx of inexpensive handsets, and low-value prepaid contracts, mobile technology has introduced telephony into the hands of millions of first-time rural users in the developing countries.

These mobile technological developments have led to a number of non-voice mobile technology communications are referred to as Mobile Data Services (MDS) in the information systems studies. For the purposes of this thesis, mobile data service is defined *as wireless access to an assortment of data services using a mobile phone* (Bina and Giaglis, 2005). MDS services include communication services (e.g. email, internet), entertainment services (ring tone, mobile TV, mobile games), transactional services (e.g. Mobile Payments, Mobile Banking, Mobile Money Transfer) and Information services (e.g. news, weather). A number of these MDSs have already become part of daily life practice. There is a continued development of new mobile data services regularly to promote some daily activities and challenges in society.

The ubiquitous (anywhere, anytime) characteristics of the mobile technology and its applications makes it an essential developmental tool to meet social challenges and leapfrog the development of basic services in the emerging economies. One of such challenges is access to financial services in the developing economies. A recent World Bank report indicates that 50% of adults worldwide and only 41% in developing countries, do have an account in a formal financial institution, making the number of people with access to mobile phones far exceeding those with access to financial services (Demirguc-Kunt & Klapper, 2012). Furthermore, Beshouri & Gravr\aak (2010) projected that the total number of people with a mobile phone, but no access to banking services will reach 1.7 billion by the end of 2012. The majority of these people are rural dwellers in developing countries. Thus, a mobile data service referred to as mobile money was developed as a means of making financial services available to the unbanked (Porteous, 2006). Captioned as "banking the unbanked", the transformational mobile banking services, is seen as a means for providing financial inclusion by most emerging economies (Porteous, 2006 p.). "Financial Inclusion" can be referred to as ensuring access to formal financial services; including savings, micro-credit, remittances and

insurance products at an affordable cost in a fair and transparent manner (de Koker & Jentzsch, 2012)

However, to succeed, the mobile money services have to be accepted, used and adopted. The financial service literature posits that specified low-cost and accessible financial services will attract a significant number of consumers who previously could not be easily accessed (Datta et al., 2007). To the contrary, the extant literature shows that the deployment of mobile money has had varied responses in different countries and communities defiling the key assumptions underpinning some of the existing technology adoption theories (Camner, Sjöblom, & Pulver, 2009; Merritt, 2011). For example, whereas the introduction of mobile money in Kenya had over 2m users within two years, the same deployment saw far less uptake in Ghana and Tanzania (Camnar & Sjöblom, 2009).

Mobile Money adoption is an instance of information technology acceptance and use within an environment that combines technology adoption with the need for financial services. The triumphs of mobile money may not be achieved in an environment with versatile financial services. Thus, mobile money presents itself as a solution for "banking the unbanked". Several theoretical models have been proposed to explain and predict key outcomes associated with technology acceptance and use. These theories include Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980), the Theory of Planned Behavior (TPB) (Ajzen, 1991), and the Technology Acceptance Model (TAM) (Davis, 1985). More so, Innovation Diffusion Theory (IDT) (Rogers, 1995) , Domestication Approach (Silverstone & Hirsch, n.d.) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003). However, most of these theories were generalized with empirical data from the economically developed countries, which may be irrelevant in the developing world context (Donner, 2009). Further, little attention has also been provided beyond the technology acceptance and adoption literature. The extant literature separates studies of use and the effect of use from the initial technology acceptance and use. Thus, extremely few studies have extended the consumer's adoption decision process to include the acceptance, use and the meanings that he or she places in the technology through existing social practices and how the interactions between technology and the social practices affect the eventual adoption of the technology. Therefore, the aim of this research is to provide a number of studies on technology

acceptance, use and adoption increase understanding and provide some explanation to this phenomenon.

These developments have led to new systems, concepts and applications in the whole spectrum of the social environment. For example, mobile healthcare systems developed in the field of health. These systems involve the sending of a patient‘s physiological and physical parameters anywhere and at any time and transmit them via mobile phones, to locations where expert medical personnel resides. Thus, providing increased access to better healthcare expertise and at the same time providing practitioners access to the vast amount of medical literature through online databases(M. Shin, 2012; Varshney, 2009). Varshney (2009) stressed that the role of mobile networks in healthcare will become more prominent with an increasingly mobile society and the deployment of mobile and wireless networks (p. 125). In addition, in agriculture, mobile applications are developed that focus on integrating agricultural supply chain. They have a wide range of functions, such as providing market information, increasing access to extension services and facilitating trade links (Donner, 2009). In many implementations, mobile application for agriculture have increased the wealth of farmers by giving them pricing data, which enables them to sell the foodstuff at the right market price (J. C. Aker, 2010). The extant literature has recorded other applications in environmental and disaster relief (Samarajiva, 2005), financial services (Morawczynski, 2011) and mobile learning (A. Kumar et al., 2010).

1.2. Theoretical Rationale for the Study

The last two decades have seen a tremendous increase in the number of theoretical and empirical data systems research on technology acceptance, use and adoption. Scientists seek to understand how consumers come to accept, use and adopt the technology as the development of mobile data services increases. There have been increasing attempts to modify, expand or enhance the existing information systems theories with what is sometimes contradicting and conflicting constructs at different levels of analysis and end-user perspectives. Fundamental to these studies is the definition of adoption as a static event and the excessive attention given to the prediction of consumers' intention to adopt through the use of TAM, TPB, IDT, UTAUT and their derivatives (Cheong & Park, 2005; Kwon & Chidambaram, 2000; Nysveen, Pedersen, & Thorbjørnsen, 2005a). While these existing literatures contribute to the understanding of why consumers accept a certain

mobile data service, gaps remain in the understanding of the process by which consumers decide whether to continue to use and finally adopt the service (Bhattacherjee, Perols, & Sanford, 2008). In most instances, studies are based on models that attempt to explain the consumer's intention involving a combination of motivational, attitudinal, social and resource based factors (Pedersen, 2005) with no clear distinction between technology acceptance and adoption. Additionally, other researchers lay emphasis on the impact of the technology post adoption through the meanings that the individual ascribes to it from the perspectives of domestication approach (Haddon, 2006). Thus, scholarly IS literature tends to produce a gap between technology acceptance and the social implications of adoption. This could be partly attributed to the interchangeable use of technology acceptance and technology adoption in Information Systems (IS) literature (Hynes & Richardson, 2009).

The essence of studying adoption is that, while initial acceptance of a mobile data service is an essential first step toward realizing its success, long-term viability of the service and its eventual success depends on its continued use rather than first-time use (Bhattacherjee et al., 2008). Further, whereas technology acceptance leads to consumer's initial use of technology, the technology adoption process may be conceptualized as a temporal sequence of steps through which a consumer passes from first knowledge of an innovation, to forming a favorable or unfavorable attitude toward it. The consumer establishes a behavioral intention to use and put the innovation to an initial use. Finally, evaluate the initial use and make a decision either to continue to use or not (Karahanna, 1999). Renaud & Van Biljon (2008) posit that when an end-user embraces a technology, then he or she expects to replace the item if it breaks and find innovative uses for it (p. 2). The distinction between technology acceptance and adoption is crucial in understanding the adoption process over time. From a theoretical perspective, knowing the different antecedents of each stage of the adoption process is vital in explaining the formation of the initial intentions of a particular mobile service.

Thus, the theoretical rationale for this research is to examine the adoption of mobile money as a multi- stage process that includes technology acceptance, use and adoption; and identify the diverse beliefs and attitudes that affect the end user's adoption process by combining existing constructs from technology acceptance studies and the domestication approach. For the purpose

of this study, adoption is a stage in the adoption process when the technology has become embedded in the everyday life of the consumer. Are the antecedents of technology acceptance, usage and adoption the same? At various stages of the MDS adoption process, which of the beliefs are more prominent? These are the theoretical questions that this dissertation will attempt to answer. Specifically, the study investigates the factors that influence the end-user decisions at the various adoption stages. Thus, this study is a reply to Rogers (1995) call for a more detailed set of beliefs and their impact on individual technologies.

1.3. Research Objectives and Questions

The overall objective of this study is to examine the phenomenon of mobile money, its acceptance, use and adoption. One of the primary features of the mobile money application is its ability to "bank the unbanked". Thus, a key sub-objective of this research is to examine the antecedents of mobile money adoption by the unbanked by seeking an explanation for why unbanked? The study is to provide some understanding of the multiple aspects of mobile money adoption, which includes the acceptance, use and the eventual adoption into the everyday life of the consumer.

The first sub-objective: Although the presented research focuses on understanding the consumer behavior towards the acceptance, use and adoption of mobile money services, a study of the roles of the various actors and their interactions within the mobile money ecosystem will enhance the understanding of the overall consumer experience. This sub objective seeks an interpretation of the environment in which the adoption of the mobile money service is situated. In answering the question below, we intend to provide an insight into the characteristics of the various actors and the different types of business models, structures and symbiotic relationships that exist between them.

Research Question 1: What are the key roles, structures and relationships between the different actors in the mobile money ecosystem?

The second sub-objective: The focus of mobile money implementations is to bring banking services to the unbanked. Therefore, it is necessary, to seek to understand the key determinants of their intentions to use the services. It may be required to assess the underlying causes of the unbanked and the unbanked's basic characteristics, to be able to determine the success of any solution to bank the unbanked. Thus, the research question 2 seeks an explanation to whom the unbanked are in trying to determine the antecedents of mobile money technology acceptance. The objective is to

assess existing determinants of technology acceptance to the mobile money concept while trying to learn any new construct that enhances the understanding of the phenomenon.

Research Question 2: What are the key determinants of technology acceptance of mobile money services?

The Third sub-objective: The newness of this innovation provides an opportunity for which contributions can be made in the diffusion studies by seeking an empirical support for Rogers' typology. Therefore, it is both challenging and contemporary to examine the characteristics of Mobile Money users at this early market stage and also, identify potential predictors of further acceptance and, eventually, mass adoption of this phenomenon. Understanding the key characteristics of adopters is clearly of theoretical and practical relevance to behavioral science (Bartels & Reinders, 2011). The research question is thus, formulated as;

Research Question 3: How have the characteristics of a consumer determined the timing of their adoption?

The fourth sub-objective: The goal of this aspect of the study is to obtain a thorough insight on the true user experience, discovering and explaining user behavior and attitudes towards mobile money services. The study will look for both problems and practical aspects of users' experience with mobile money services. Donner & Tellez (2008) posit that study that involves the use approach to assessing the growth of mobile money is sorely needed. Applying the domestication perspective within an interpersonal context, this study purposes to examine why the use of mobile money has been adopted in Kenya and how it has affected the consumer's social practices and if possible its effect on the technology.

Research Question 4: How was the mobile money services appropriated, used and adopted into the everyday life of consumers?

1.4. Research Methodology

A broad picture of a research design adapted from (M. Saunders, Lewis, & Thornhill, 2007) can be depicted in Figure 1.1. The words in bold in Figure 1.1 represent the chosen elements in this research study and an explanation of their details are in chapter 4. This research takes the paradigmatic stance of pragmatism to understand the mobile money service, its adoption, use and

impact of social practices by conducting mixed method research in triangulation. This is primarily because we do not think that scientific investigation of truth can only be obtained through a single lens of scientific paradigm either positivist or constructivist. Given the multi- faceted nature of the study, the pragmatism approach was the most appropriate. The objective of pragmatism is the belief that the research question should determine the paradigm adopted at any instance of the study (Maxcy, 2003). From a pragmatist perspective, the current study holds a position that agrees with (A. S. Lee, 1991), that interpretive research and positivist studies do not oppose each other and mutually exclusive, but are consistent and mutually supportive. Hence, the research question in the study determines the data collection methods and interpretations (deductive or inductive reasoning) adopted.

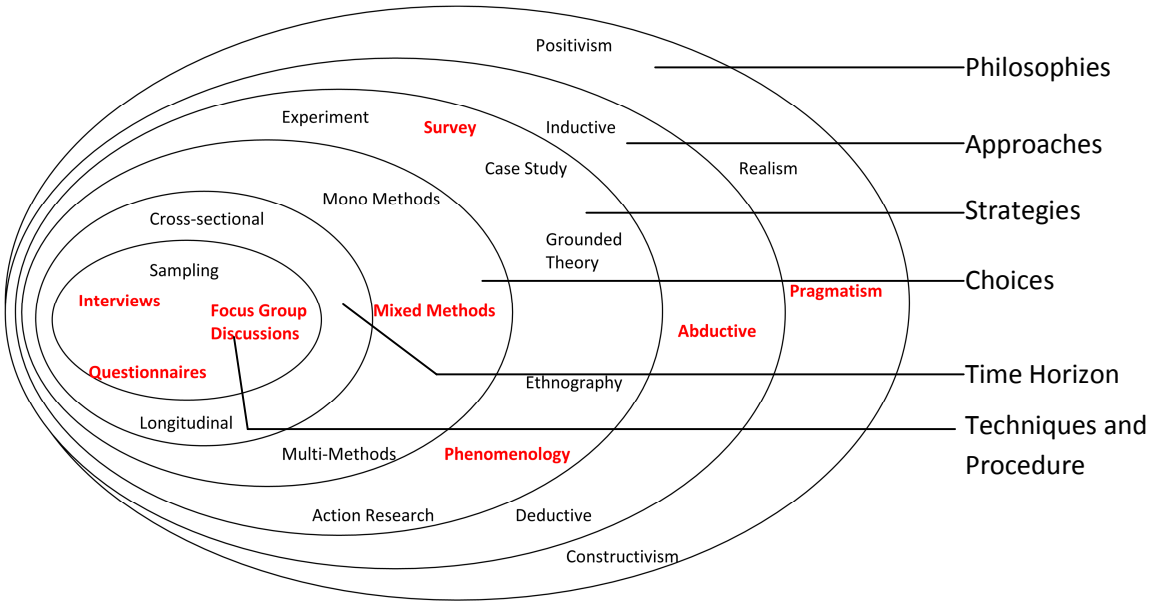


Figure 1.1 The Research Onion Source: Saunders et al. (2007 p.132)

The overall design of the study is cross-sectional but embedded in different levels of triangulations (repeated cross-sectional studies, with different samples and aspects of the phenomenon). By cross-sectional, the study is interested in understanding the consumer's perception and use of technology at a point in time, not necessarily how those variables change over time. A number of data collection techniques were engaged during this study. The research design classified the study into four phases. In all, there were three fieldworks organized into two phases; phase 2 and phase 3. Phase 2 of the study consisting of fieldwork 1 and fieldwork 2 took place in Ghana. Fieldwork 1

was used to test the applicability of existing information systems adoption theories to the new phenomenon. A questionnaire data collection technique was applied for this fieldwork. Fieldwork 2 sought to provide further insight into the antecedents of adoption found in fieldwork 1 through a series of focus group discussions.

A quest to understand a phenomenon shaped the third phase, which is the third and final fieldwork of this research. Taking place in Kenya, the third and final fieldwork aimed at providing data on consumer experience of the mobile money phenomenon. Cresswell (2007 pp. 57-59) described such approach as: "the meaning for several individuals of their lived experiences of a concept or a phenomenon." He clarified it further and stated: "phenomenology is not only a description, but is also seen as an interpretive process in which the researcher makes an interpretation of the meaning of the lived experience." This phase of the study aimed to provide answers to the fourth and final research question. The data collection technique used in this phase was focus group. Kenya was chosen because of the maturity of its mobile money market. It presents an opportunity to analyze the diverse use experiences of its adopters and in addition, to a large degree the ideological argumentation of the non- adopters.

1.5. Summary of Papers and Findings

This is a paper-based thesis. In all, the thesis is based on six published papers made up of 4 journal publications and two conference proceedings. The objectives and their related research questions for each of the papers are linked to the overall objective and research questions of this study. The table below presents the papers, their objectives, research questions and significant findings. The Author of this thesis is the sole author of papers 1,3,4,5 and 6. Joseph Adjei is the Co-author for paper 2. He contributed to the analysis of the data.

Table 1.1 Description of Papers

Paper Title	Objectives	Key Questions	Findings
1 Modeling Adoption of Mobile Money Transfer: A Consumer Behavior Analysis	Explore the key factors that affect consumer behavior towards adoption and use of Mobile Money Transfer.	What are the key determinants of user acceptance of Mobile Money Transfer?	Supports the Key TAM constructs of PU and PEOU, and Trialbility from DoI; additional constructs identified are Risk, and Trust.
2. Understanding the Characteristics of Early and Late Adopters of Technology: The Case of Mobile Money	Uncovering the unique characteristics and motives of early adopters of mobile money.	How do the early adopters of mobile money differ from its late adopters?	Novelty Seeking, Innovativeness, Opinion Leaders and Demographic characteristics affect the early adoption of mobile money services.
3. Understanding Mobile Money Structure, Business Models and Relationships	Understanding the structures, business models and the relationships between the key players in the mobile money ecosystem.	How is the structure of the mobile money evolving? In addition, what strategies are its key players adopting to ensure sustained robustness and productivity?	The MNO led mobile money system is more likely to succeed than the bank led mobile money system. MNOs should adopt a keystone strategy. MNO relationship with the consumer was found to be a crucial determinant of acceptance and use.
4. The adoption of "Transformational Mobile Banking" by the Unbanked: An Exploratory Field Study	Identify the barriers to m-banking by the rural unbanked.	How can m-banking be transformational (Banking the unbanked)?	M-banking removes - Access, documentation and affordability barriers. However, it creates technology anxiety for most rural consumers. Compatibility to social practices was found to be essential for individuals to accept the technology.
5. Towards a model of adoption of mobile banking by the unbanked: a qualitative study	Identifying the key factors that influence the unbanked's intention to adopt and use mobile banking services	What are the key factors that influence the acceptance of m-banking by the rural unbanked?	Found key antecedents of the PU and PEoU, Trust, Perceived Economic factor (PEF) as the key determinants of mobile money adoption by the unbanked.
6. A Qualitative Investigation of Use and Adoption of Mobile Money in Kenya: A Domestication Approach	Examine the various use of mobile money in Kenya; How the various uses are affecting the social practices of money in Kenya using the Domestication Approach.	How individuals in Kenya domesticate mobile money into their everyday life and how does that affect his/her social practices?	Aside the usual cognitive factors that influence the acceptance and use of mobile services, we found social networks, functional and symbolic meanings and social practices of money as factors that affect consumers' decisions to accept, use and adopt mobile money services in Kenya. A new set of causalities were found to determine technology appropriation.

In general, the current study provided a number of contributions to literature. First, the application of empirical data from various sources in this research (data triangulation) afforded the rich analysis that led to the creation of the Integrated Mobile Money Adoption Model (iMoMAM). The iMoMAM provides an adoption process model with three key stages - acceptance, use and adoption and the antecedents of the process stages. Through the iMoMAM, an attempt is made to

deepen the existing theory of technology acceptance, use and adoption, by proposing an adoption process which is based on fundamental consumer decision making principles combined with contextual causes and effects grounded in a social environment. Second, the current research furthers understanding of the adoption of IS and identifies public meaning, private meaning and social influence as the direct determinants of technology appropriation. It enriches extant literature by providing current data on the acquisition and use of mobile phones in a developing country - Ghana. Furthermore, it provides contextual information about how this new phenomenon is being used by certain social actors.

1.6. Structure of the thesis

In order to show how the thesis approaches the research objectives and questions and will generate the previously mentioned contributions, this section outlines the structure of the thesis and the presentation of results.

This thesis consists of two parts; part 1 contains the integrative summary of the research and part 2 contains the list of academic published papers, which contain the research findings. The aim of the integrative summary is to provide the overall research philosophy and methodology that has guided the research and to unveil the underpinning objectives and research questions of the study. Further, it is to synthesize the research documented in the six articles while also providing detailed discussions expanding on them.

The structure of the rest of the integrative summary is as follows: the following chapter is to provide a descriptive report on the current state of the mobile society of Ghana and brief background information on the mobile market of Kenya. By mobile society, the aim of the chapter is to present the findings of a mobile barometer survey that was conducted in Ghana. Even though similar in-depth account was not available in Kenya, we observed that the mobile society of the two countries was quite similar. In chapter 3, a theoretical framework which has guided the entire research was constructed. It reviews key consumer technology acceptance, use and adoption decision process models. In chapter 4, we explicate the philosophical paradigms and methodological choices adopted during this study. It begins with philosophical discussions on

various epistemological and ontological stances in information systems research and concludes with a clear picture of the research design.

Chapter 5 presents a summary of the research questions, findings and contributions of the various papers. Chapter 6 presents a discussion of the phenomenon. It also presents the limitations of the research. Then finally, chapter 7 presents the conclusions and limitations of the study.

2. Context

2.1. The Case for Mobile for Development

There is near universal consensus on the importance of adopting information and communication technologies (ICTs) for accelerating the development in the world's poorest countries (ITU, 2011b). Since the *Digital Opportunity Initiative* report developed by the Digital Opportunity Taskforce in 2001, the fight against poverty recognizes ICT as a significant contributor and in achieving the millennium challenge goals (Initiative, 2001). In a recent report on the "ICT competitiveness of Africa", Javier Ewing et al., (2012) showed how the development of ICT in most African countries can be linked to the GDP of the countries. Analyzing the possible growth of ICT based on percentage of GDP, they predicted that the expenditures in ICT could be close to 160 billion by 2016 (p. 31). Furthermore, in all the three countries studied (Kenya, Nigeria and Morocco), the mobile penetration was more than three times higher than the Internet penetration.

Development practitioners are increasingly searching for diverse ICT solutions of human development that include the use of pervasive devices like the mobile phone. It is accepted that through ICT, new business opportunities and applications to support rural development, in terms of, health, agriculture, education and e-governance will spring up (Kaushik & Singh, 2004). The rapid growth of mobile communication technologies presents it as a key tool in achieving these developments in the developing countries. The rapid rise in mobile network penetration and quality reduced handset prices, reduction in call charges resulted from open market, which, encourages competition are a few of the factors that have made mobile communication a better option than other forms of ICT for development components (e.g. Internet) (Javier Ewing, et al., 2012, p. 14). Furthermore, the minimal level of education required to operate a mobile phone makes it more accessible to the developing world, especially the rural population.

In a recent mobile for development conference in Mumbai, India, 2012, there were several reports of studies highlighting the potential developmental benefits of mobile applications. The presentations and subsequent discussions included several core themes like m-Health, m-Agriculture, m-Empowerment, m-Learning, m-Governance and m-Media. The majority of applications are skewed towards providing some form of development to the rural areas of the developing countries. For example, in m-Health, Treatman & Lesh (2012) described how a

multimedia application called CommCare is used in over ten countries in delivering community healthcare services. The paper concludes that CommCare led to an overall increase in performance of the community healthcare workers. Specifically, it improved engagement and Credibility. There are several other applications of mobile to health development. They range across remote diagnostics and monitoring, diagnosis and treatment, transferring medical records remotely (V. Kumar & Svensson, 2012).

2.2. Mobile Money

The two main roles of money are as a store of value and a means of exchange (Alleman & Rappoport, 2010). The developing economies operate a cash economy with less than 70% of the population without a bank account (Jenkins, 2008). Mobile phones' ability to store standards and be used as a means of exchange coupled with its vast diffusion levels presents itself as an opportunity to realize the highest number of unbanked people in the developing world (Dahlberg, Mallat, Ondrus, & Zmijewska, 2008).

The concept of mobile money becomes known from the mobile industry and the developmental/practitioner arena with remarkably little academic literature. Specifically, it became crystallized as a payment system based on mobile phones after the first two "Mobile Money Summits" in 2008 and 2009 (Maurer, 2012). It is also referred to as mobile financial services and mobile banking. However, literature to explain this phenomenon can be adopted from the mobile commerce research area with specificity in mobile payment and mobile banking domains. In a recent literature review by (Diniz, de Albuquerque, & Cernev, 2011), there were a total of 94 peer reviewed papers on mobile money and mobile payment from nine key databases and 15 journals. A further analysis of the 94 papers showed that the majority of them are based on developed world cases on mobile payments, with little or no reference to mobile money as a developmental tool. Furthermore, about 75% of the papers reviewed are from conference proceedings. Given the impact of mobile money it is surprising that there is still extremely little attention from the academic world on this phenomenon.

Even though mobile money has not been well defined in the literature, it can be said to include all the various initiatives (long-distance remittance, micropayments, and informal airtime battering

schemes, mobile payment and mobile banking) aimed at providing financial services through a mobile phone (Dolan, 2009). Jenkins simply defined it as money that can be accessed and used via mobile phone (Jenkins, 2008). Central to all possible definitions of mobile money is the use of mobile phones in the financial services sector. In general mobile money services include 1) person-to-person transfer of funds, such as domestic and international remittances, 2) person-to-business payments for the purchase of a range of goods and services and 3) mobile banking through which customers can access their bank accounts, pay bills, or deposit and withdraw funds (Dolan, 2009). These services include the capability of turning a mobile device into a business tool, substituting or complementing banks, ATM and credit cards (Vashney & Vetter, 2002).

2.2.1. Key Drivers

The key drivers for mobile money deployment in developing countries have been the rise in remittance services both local and foreign and the provision of financial services to the rural unbanked (Jack and Suri, 2011). Although, mobile money is much associated with mobile payments, its most significant achievement to date is on the person to person transfer of funds and the provision of banking services to the unbanked (Muwanguzi & Musambira, 2009). For example, in its initial usage, M-PESA (Safaricom's mobile money services in Kenya) was characterized by person-to-person money transfer from the urban workers to their families in the villages (Muwanguzi and Musambira, 2009; Morawczynski, 2011). Also, in the Philippines, remittances to family members on remote islands through Globe GCASH was being used by over two million people (Maurer, 2012).

Individuals, especially those in split families had a tremendous need and willingness to pay to make remote payments conveniently and securely (Berman, 2011). During the fieldworks, both in Ghana and Kenya, many reported paying large sums (sometimes up to 20% of value) to bus drivers and "matatus" (a mini-bus that carries up to 14 passengers in Kenya) drivers to send funds to their families in the villages. Although vast sums are paid in fees, transfers through bus drivers had many disappointments, such as, lateness, frequent breakdowns, and drivers being attacked on their way. The desire to engage in person-to-person money transfer using mobile phones in some countries precedes mobile money. Prepaid airtime was being used as a mechanism for money transfer and the purchasing of goods and services (Merritt, 2011). Individuals will purchase airtime credit, transfer the credit to their recipients, who in turn sell the credit to an agent. The cost of the money transfer is the

difference between the selling and re-purchase price of the airtime credit. Although, the transaction cost was high, this was the only option to consumers in some cases.

The rapid deployment of telecommunication infrastructure throughout the developing countries meant that the rural areas were being reached. The mobile operators and their distribution channels were reaching the remote parts of the countries. This meant that more and more places where it was not profitable to build a retail bank, now have access to mobile phone and the operators' distribution networks; thus, making it possible to extend financial services to large segments of the unbanked poor people. The instantaneous transfer that takes place when a consumer purchases the electronic value instills some confidence in the mobile money transaction.

2.2.2. How Mobile Money Transfer Works

In its broad sense, either a traditional banking institution, mobile network operator or a third-party service provider can deliver mobile money. As indicated in paper 3, the MNO as a keystone player is the best business model. Thus, this research limits mobile money for the provision of financial services through an MNO to the unbanked. Although, central to the mobile money concept is a mobile phone, it is more than a technology - it requires payment infrastructure, which is achieved through a network of agents and merchants who provide the necessary contact for users to cash-in and cash-out (Donovan, 2012). Figure 2.1 below shows the mobile money ecosystem with its key actors. See paper 3 for more information on the descriptions, roles and relationships between the key actors. The mobile money industry presents a diverse set of actors in its ecosystem because of its position at the intersection of the financial and telecommunication industries. For example, in urban areas, bank branches acts as agents, aside the traditional mobile operator's distribution network of agents. Furthermore, the convergence implies that there are two sets of regulators who are interested in mobile money implementation in most countries; the telecom regulator and the financial services regulator (Merritt, 2011). The primary objective of regulation is to protect consumers through enhanced service delivery and competition. The harmonization of the regulatory requirements of the two regulators is significant for a conducive environment for the development of the mobile money services. The success of M-PESA is attributed to the absence of stringent formal regulatory requirements from the beginning (World Bank, 2010). New regulations will be required to close gaps in the legal and regulatory frameworks as the mobile commerce market evolves. This will

ensure effective consumer protection and better integrity in the payment system (Merritt, 2011 p. 24).

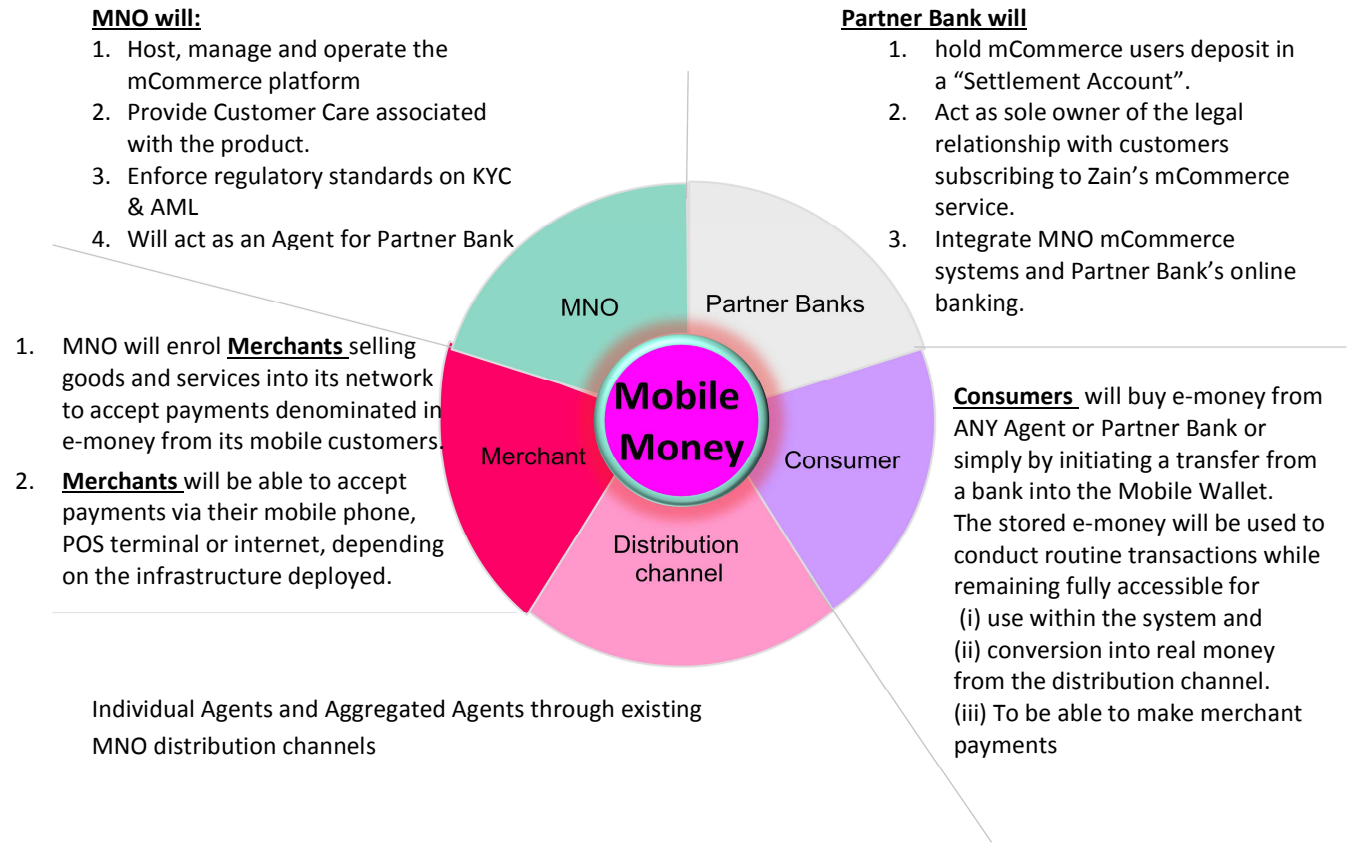


Figure 2.1: The Operational Mobile Money Ecosystem

The mobile money consists of a number of interconnected systems that form the mobile money network. It is a client server based system with the client application residing on the SIM card, a chip that identifies the subscriber's phone number, connecting to MNO's m-commerce server. When initiated, the application connects to the MNO's network and uses the SMS protocol to communicate with the m-commerce server. A mobile money transfer will usually involve 4 steps: registration, cash-in, transfer, and cash-out. A onetime registration process (1) is required before a user can use any of the mobile money services. The registration process is usually free. A customer visits an agent and fills in an application form. The agent verifies the customer's ID (either a national ID, driving license etc) then uses his phone to register the customer temporarily on the MNO's m-commerce server. An account with a mobile wallet (m-wallet) is created on the m-commerce server, an SMS confirmation is sent to the customer. The customer chooses a secret PIN, which becomes his

main authentication token for all future transactions. The application form with the verification proof is sent to the MNO who then establishes the mobile wallet.

The cash-in process (2) involves the purchasing of electronic money (e-value) into the m-wallet. The customer then visits an agent and pays an amount of electronic value. The agent transfers the e-value from his/her special SIM mobile phone to the customer through the m-commerce server. Further, an encrypted SMS is sent from the agent's mobile phone to the m-commerce server, requesting for, the transfer to be drawn between the two accounts. An encrypted SMS is sent to the customer to confirm the transaction.

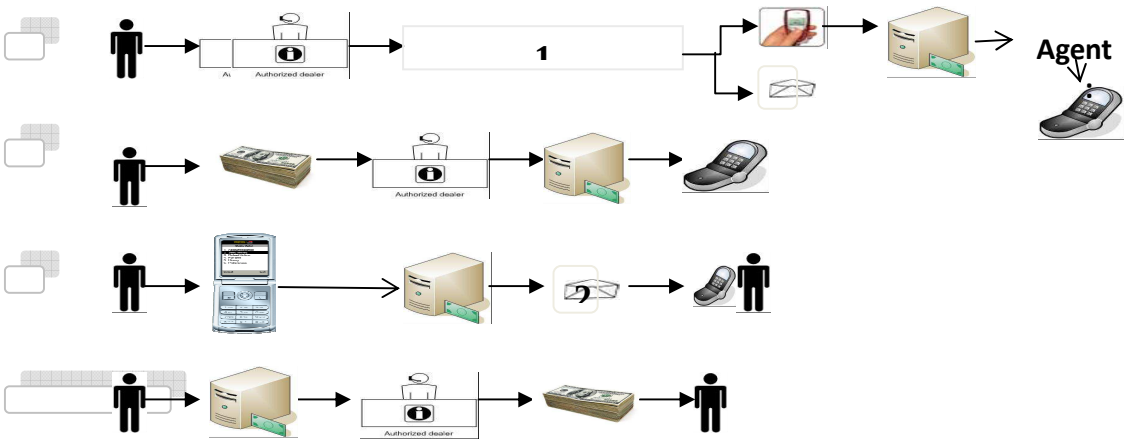


Figure 2.2: Mobile Money Transfer Process

The next step is the actual transfer stage (3). This is usually done through the customer interface on a basic model phone. To select the best method, which provides a compromise between usability, security and costs, most implementations use a menu driven access by the SIM toolkit, which is the standard software on all mobile phones (Hughes & Lonie, 2007). The customer using the menu on the SIM transfers the e-value from his/her phone to the recipient's mobile wallet. This involves an encrypted SMS to the m-commerce server from the sender with an instruction to transfer the specified amount to the recipient. After verification and availability of funds checks, the m-commerce server actions the instructions by debiting the sender's account with the amount and any fees charged (where applicable) and crediting the recipient. A confirmation through an encrypted SMS is sent to both the sender and the recipient. Most mobile money implementations to

date use either SIM Toolkit (STK) or its equivalent USIM (Universal Subscriber Identity Module) application toolkit as the technology platform. However, there are other platforms like USSD (Unstructured Supplementary Service Data) used by Vodacom in Tanzania (Camnar & Sjöblom, 2009). Figure 2.2 illustrates four basic steps that the sender goes through to transfer the money. An encrypted text is then sent to the recipient to inform him/her about the transfer and confirms the recipient's new account balance in the m-wallet. The fourth and final step (4) involves a recipient visit to the agent to cash-out the transferred e-value. Also, the recipient might decide to either use it to make payments, or leave it in the account (store of value) for a while.

2.2.3. The Adoption of Mobile Money

The acceptance, use and adoption of mobile money as a phenomenon of interest is contemporary and scarcely researched. Studies from the development/practitioner literature dominate research in this area of Information Systems (Ivatury & Pickens, 2006; McKay & Pickens, 2010; Porteous, 2006). However, since the launch of SMART Money in the Philippines in 2003, there are currently 145 mobile money deployments which have been launched across 73 developing countries (MMU, 2012). There is a further 104 deployment planned. The year 2010 alone saw 31 new mobile money deployments in 25 countries. There are varied business models including MNO-led, Bank-led and mobile content provider-led. So far the most successful deployment of mobile money is Safaricom's M-PESA in Kenya. Since its launch in March 2007, it has been adopted by 11.7m customers (corresponding to 54% of Kenya's adult population and 73% of Safaricom's subscriber base) and routes extra transactions nationally than Western Union does globally. US $415 million per month in person-to-person transfers, equal to 17% of Kenya's 2009 GDP on an annualized basis (Mas & Radcliffe, 2010). However, similar implementations in other countries (Tanzania, Ghana and Uganda) have not enjoyed the same level of popularity and success. This calls for an investigation into the key determinants of adoption and use of mobile money to assist the future development of its applications.

In an empirical study of the factors affecting the adoption of mobile banking by the poor in South Africa, Ismail & Masinge (2011) found perceived usefulness, perceived ease of use and affordability as the key determinants of consumer adoption of mobile banking. However, perceived risk was found not to influence the adoption of mobile banking significantly. In a separate empirical study by

Ajo et al., (2012), 67% of the sample population gave a rating of five (excellent) and four (good) that they felt comfortable using the M-PESA services. Further 87% of the sample reported that the system was easy to learn how to use.

Adapting Grewal (2008)'s drivers of adoption, (DONOVAN, 2012) explained that the adoption of M-PESA in Kenya was due to the interplay of reason, force, and chance. Reason is explained as the intrinsic meaning that a user derives from the characteristics of the technology and extrinsic meaning that comes from the attractiveness of being a member of a network. Force, on the other hand, can be direct or indirect pressure on a user to adopt the technology. He explained that the effect of intrinsic meaning is pungent at early adoption stage whiles the network effect (extrinsic) is most effective at later stages of adoption.

2.2.4. Mobile Money and Demographics

Jack & Suri (2011) carried out a survey of 3000 randomly selected households in Kenya, the largest survey on M-PESA so far. The sample was selected from a frame that covers 92% of the entire Kenyan population. In general, they found considerable variations between adopters and non adopters on one hand, and the early adopters and late adopters of M-PESA in Kenya. The results show that although there was no significant difference between the gender of the users, the adopters are more likely to be literates than the non-adopters. Also, the early adopters of the M-PESA were found to be wealthier and more literate than later adopters. They concluded that the success of M-PESA is due to the rapid expansion of the agent network with the majority of the respondents having good experience with their agents. Their findings also showed the impact of M-PESA on its users indicating that 92 percent of users expect a large and negative effect from M-PESA shutting down. Similarly, Mbiti & Weil, (2011), in examining micro-level data from the Finaccess surveys between 2006 and 2009, concluded that frequent M-PESA users are more likely to be urban, educated, banked and affluent.

2.2.5. Mobile Money and Savings

Demombynes & Thegeya (2012) distinguished between two types of mobile savings; the basic mobile savings and the bank integrated mobile savings. The key difference is on the payment of interest on the bank integrated mobile savings. The basic mobile saving is what users use in most deployments of mobile money around the world. Even when the M-PESA was not designed for the store of value, increasingly sophisticated consumer demand drove the development of new services (Dolan, 2009). Safaricom introduced a fully integrated mobile savings system, referred to as M-KESHO, to M-PESA users in Kenya. Until m-kesho was introduced in 2011, the only form of savings on M-PESA was the basic mobile savings. Mas & Morawczynski (2009) reported a significant number of M-PESA users using it to store value. However, Mbiti and Weil (2011), posit that although a significant number of survey respondents indicate that they use their M-PESA accounts as a vehicle for saving, their analysis of aggregate data suggests that the overwhelming use of M-PESA is for transferring money from individual to individual, with extremely little storage of value. Further evidence shows that M-PESA use diminishes the use of informal savings instruments such as ROSCAs and raises the likelihood of being banked. In Jack and Suri (2011)'s survey, they found that M-PESA consumers with a bank account are more likely to save on M-PESA than M-PESA users without a bank account. The greater part of users cites ease of use and security as the most powerful motivation for saving on m-pesa. Ironically, Demombynes and Thegeya (2012), reported that despite the reported high rate of use of basic mobile savings, surprisingly, the introduction of m-kesho has not received that much attention by the same M-PESA users.

2.3. The Unbanked

In a survey of more than 150,000 adults in 148 economies, Demirguc-Kunt & Klapper (2012) found that there are about 2.5 billion adults, more than a third of the world's population without a formal bank account. The total number of mobile phone owners without access to banking services is estimated to be 1.7 billion at the end of 2012 (Beshouri & Gravråk, 2010). Research suggests that there are unbanked in both the developed and the developing countries. For example, there are millions of Americans whose everyday transactions like check cashing, making payments and taking out short term loans rely on high-cost currency exchanges and pawn shops (Lyons & Scherpf,

2004). Although, there are some poor households without access to banks in the developed world, the situation is precarious in the developing world, particularly in Africa.

In a series of studies conducted by FinMark Trust exploring individuals' usage of and attitude towards financial services in African countries, it was observed that, in many African countries, less than one in five people have access to a formal bank account (FinMark Trust, 2009). However, in these countries, there is an increase in informal financial services in the form of community-based financial support groups and associations. For example, individuals within a community contribute savings to a pooled account, lend a portion to members and periodically share the proceeds (savings plus interest on loans). An individual (usually well respected in the community) is appointed as a treasurer who stores and disburses the funds. Loans are taken for various reasons including trading, funeral arrangements and payment of school fees for children. In terms of money transfer and payment transactions, the rural/poor households depend on bus drivers, relatives/friends and long distance travel (J. Aker & Mbiti, 2010). A complex and a wide range of cultural and economic issues could be attributed to individuals having no, or limited, access to financial services.

The term unbanked can be defined as "people without formal bank accounts who operate in a cash economy; they are limited in their ability to take out loans, maintain savings, or make remote payments" (Medhi, Gautama, & Toyama, 2009; Medhi, Ratan, & Toyama, 2009). However, they may take a loan from local loan sharks or maintain savings informally. For example, in a study of the economic impact of M-PESA in Kenya, Jack and Suri (2009) found that a large percentage (about 80%) of the households studied save money at home "under the mattress". The literature indicates that people are unbanked for many reasons including levels of financial knowledge of banking systems and expectation of having a bank account, past negative banking experience, lack of appropriate documentation needed to open a bank account, financial constraints and unstable living situations (Lyons & Scherpf, 2004). However, limited access and poverty are the most common factors in the literature to explain the unbanked. Firstly, the cost of managing branch offices in remote areas, in the developing countries, is said to exceed any revenues derived from the low volume of banking transactions. Hence, most bank branches are available to urban dwellers leaving most of the rural areas under-served. Policymakers, financial regulators and

development agencies such as the World Bank have been seeking diverse ways to increase financial access to the unbanked especially in the rural areas (Bankable Frontier Associates, 2010). The introduction of microfinance institutions, correspondence banks in Brazil, Mzansi accounts in South Africa and numerous branchless banking policies are some of the initiatives that have emerged targeting the unbanked. Secondly, the poor are more likely to be unbanked, and bank usage is likely to be low in poor communities. This is corroborated by the findings of (Bankable Frontier Associates, 2007) that most unbanked have no formal earnings, rely on farm income, or live on 'welfare' from friends and family.

The importance of studying the unbanked can be seen in the results of studies that relate access to financial services to the economic and social development of economies (T. Beck, Demirgü\cc-Kunt, & Peria, 2008; Bruhn & Love, 2009). Several authors have found a link between access to financial services and economic growth or poverty alleviation. Although, collectively the unbanked are regarded as poor, there is a substantial number of unbanked people in a cash economy who are reasonably wealthy. By remaining unbanked, the wealth and transactions conducted by these people are informal. Access to a bank has the potential to bring these transactions to the formal economy. For example, Burgess, Pande, & Wong (2005) found that the expansion of bank branches in rural India had a significant impact through alleviating poverty. Furthermore, in a study of the economic impact of the opening of Banco Azteca in Mexico, the results showed 7% increase in income in areas where the branches were opened with an overall 1.4% increase in employment (Bruhn & Love, 2009). Maurer (2012) explained the mobile money phenomenon as empowerment of the rural unbanked.

2.4. Mobile Phones - Ghana and Kenya

2.4.1. Introduction

This chapter serves two main purposes: (1) provide an overview of the characteristics of the mobile society of Ghana from a survey conducted as part of this PhD project; (2) an overview of mobile phones in Kenya from literature. The mobile phone has become an integral part of the daily life of most people and for the majority in the developing world, the most popular form of electronic communication. In fact, what started as a technological tool has become a social and economic tool for many people. The ownership of a mobile phone has moved from being a luxury to a necessity

for business, organizing and maintaining social networks and building relationships affecting all aspects of social structures. As Ling (2001) posited, “the introduction and adoption of the mobile telephone has led to various adjustments in a range of social institutions”.

Despite the recognized and documented rapid spread and significance of the mobile phone in the developing world, there is remarkably little knowledge about the structure and demographics of its ownership, and how it is used in everyday life. Most extant literature on mobile phone usage in Africa concentrates on its impact on economic development with exceedingly little information on everyday usage (Donner, 2008). In an analysis of 200 studies of mobile phone use in developing countries, Donner (2008) identified two key perspectives of studies, notably; adoption and impact of use and economic development perspectives. Except for some few studies that partially dealt with aspects of the mobile societies and cultural attitudes (Sey, 2008a, 2008b; Slater & Kwami, 2005), there was truly little link in the literature between the mobile users and their everyday use of mobile phones. Furthermore, Westlund (2008) in analyzing the diffusion and adoption of mobile phones posited that most researchers have concentrated on the first phase of mobile phone diffusion, which is, as a voice communication tool. He stressed that only a few have been researching about its second phase diffusion, as a multimedia device. Nearly five years since Westlund's call for studies on the adoption of the mobile phone as a multimedia device, a scan of existing IS literature in Scholar show very little research in this area. Hence, the aim of this section is to provide some reflections and analysis on how people acquire mobile phones and their various usage of it, both as a phone and as a multimedia device. This is to bring into perspective the general level of mobile usage in Ghana.

2.4.2. Mobile Telecom in Ghana

Ghana has one of the most liberalized telecom markets in Africa (Frempong, 2010). The telecom market in Ghana has six mobile telephone operators and two national fixed-network operators. The mobile telephone operators are MTN Ghana, Tigo Ghana Limited, Vodafone Ghana, Kasapa Telecom and Zain. The sixth operator, Glo Mobile has just started operations as at the time of writing this thesis, but had not started during the data collection period. With the exception of MTN and Glo, the operators are subsidiaries of multinational mobile telephone companies. The

industry is regulated by the National Communication Authority (NCA), which implements policies developed by the Ministry of Communication.

Ghana operates 'Mobile Number Portability,' a feature that enables consumers and businesses to choose to retain their existing mobile phone numbers when switching providers, is one such demand-side service that has been mandated to be incorporated in standard service offerings by July 1, 2011. The general expectations are that such demand-side policies will have a significant impact on the market, and to set the stage for a more highly competitive market. It is believed that the introduction of MNP and the sixth provider Glo Mobile will introduce even more rigorous competition and lead to a further reduction in tariffs. A report from the NCA on August 2011 showed that, after eight weeks of commencement, a total of 64,657 mobile subscribers took advantage to move their numbers from one service provider to another with an average time of porting of 4 hours, 16mins.

2.4.3. Procedure

To this end, the section analyzes a set of data, which was part of a survey conducted between March 2011 and July 2011 in Ghana under the caption "Mobile Barometer, Analyzing the Ghanaian Mobile Society". An online Survey (mobilemoneyresearch.com) and a face-to-face questionnaire distribution were conducted. For the online survey, respondents were recruited through notices on Facebook, LinkedIn, and www.ghanaweb.com, and also emails with the link attached were sent to colleagues and friends. A brief description of the purpose of the survey was given on the site. There were a total of 304 online respondents, of which 86 entries were discarded during data preparation, leaving 218 respondents for the analysis. Apart from the online data, another set of data was collected from three different regions in Ghana, namely; Greater Accra, Ashanti, and Western Region. In Greater Accra, the city center and two other suburbs were chosen, whiles Mampong a suburb of Ashanti and Kadadwen a village near Tarkwa in the Western Region were included. The choice of these sites was to increase the representation of the data. A few translations to the local dialect of Twi were necessary in some cases. However, over 90% of the study was conducted in English. In total, 840 respondents submitted a filled questionnaire. Only 790 filled the questionnaires correctly and were added to the analysis. In all, there was a combined sample size of 1008 for the study.

2.4.4. Instrument

The questionnaire used for the study was adapted from a questionnaire developed for a similar survey in Sweden. The idea is to provide similar data for future studies that compare the characteristics of mobile phone users in the two countries. Permission to adapt and use the questionnaire was sought from Professor Erik Bohlin, the chairman of the "Mobile Barometer, Sweden" project during the ITS 2010 conference in Copenhagen. The questionnaire was adapted to the Ghanaian society. Questions that are too futuristic for the Ghanaian environment were removed, and further explanations were provided to assist respondents with some of the questions. Specific cultural and social context questions e.g. "How many mobile phones do you have?" and "Does it have two or more SIM cards?" were included in the questionnaire. Demographic questions were also adapted to suit the Ghanaian society. The questionnaire had a total of 37 sets of questions divided into 7 key sections covering various aspects of the mobile users' interaction with the device. For the purposes of this section, we will provide an analysis of only four sections.

2.4.5. Findings

2.4.5.1. Demographic Data

We used data from a total number of 1008 respondents in the analysis. For the purposes of brevity, a combined data set was used for the analysis. The demographic profiles of the respondents are shown in table 2.1 below. The sample was made up of 55.7% female and 44.3% male with 96% below the age of 40 years and a mean age of 30 years. With regard to education, 38% were at least university graduates and on 9.1% had no formal education. With regard to employment, company employees comprise the majority, at 38.2%, whereas 34.1% were full-time students. To make it simpler for the respondents, we used the local currency for the study. At the time of the study, $1 was exchanged for two Ghana Cedis, approximately. Thus, a cumulative percentage of the results indicate that 88.3% of the respondents earn less than $250 per month. According to annual income and educational levels, the majority of the respondents appear to belong to the lower middle class of the Ghanaian Society.

Table 2.1 **Demographic data on respondents**

Age	Percent (%)	Education	Percent (%)	Employment	Percent (%)	Income Level (GHc)	Percent (%)
Under 18	7.3	No formal education	9.1	Employed	38.2	0 -100	49.2
18-25	39.9	Junior High school	22.4	Part-time Student	.6	100 - 200	21.3
26-30	25.2	Senior High school	30.1	Full -time student	34.1	200 - 500	17.8
31-35	13.8	University/College Graduate	34.0	Self employed	19.6	500 - 1000	10.4
36-40	9.2	Masters	3.5	Retired	.4	1000 - 2500	1.0
41-50	3.0	Doctorate	.4	Unemployed	6.5	2500 - 5000	.3
50+	1.3						

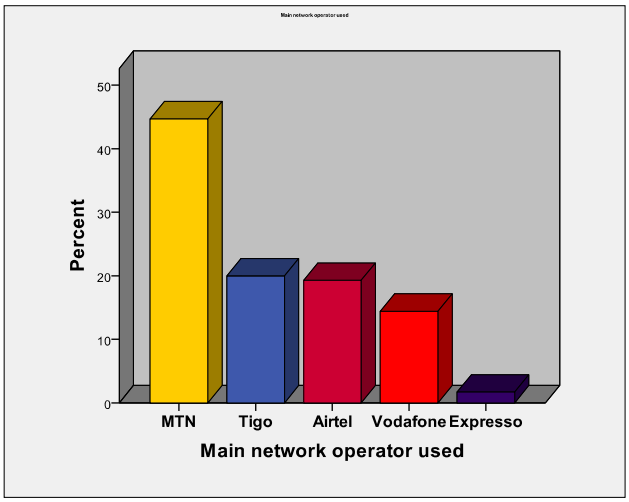
2.4.5.2. Current Mobile Service Usage Information

This section evaluates the Ghanaian mobile society's usage of mobile phone on three independent axes described by (Geser, 2004):

1. Usage intensity; that refers to, *"how often the product is used (usage time) regardless of the different applications, for which the product is used"*
2. Usage Breadth; referring to the various family friends and relations to whom calls are expected from.
3. Usage varieties: measuring the *"different applications for which a product is used or the different situations in which a product is used, regardless of how frequently it is used."*

Thus, the questions in the mobile barometer on this section are structured to cover all these axes of usage.

The total mobile voice subscriber base in Ghana as of August 2012 was 24,438,983 according to NCA, the telecom regulator (NCA, 2012) representing a 63% rise from the 2009 figure of 15 million (Frempong, 2010 p. 10; Hinson, 2011). Given 24,965,816 populations, a projection from the last census in 2010, the mobile penetration of Ghana is approximately 98%. The high level of penetration rate could be attributed to the falling prices of SIM cards, airtime and mobile phones; pre-paid subscriptions, and the rigorous competition among the mobile operators. However, without diminishing the significance of the rapid increase in adoption through market liberalization, it is necessary to note the effect of multiple SIM card on this figure (see the findings of multiple SIM card ownership below), an issue that has been raised by a few authors (Sey, 2010; Sutherland, 2009).



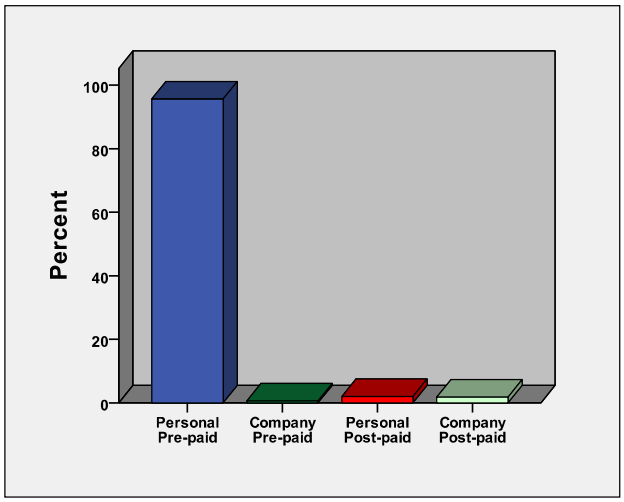


Figure 2.3 Main Network Operators

Figure 2.4 Type of charge model used for mobile phones

As shown in Figure 2.3, the majority of the respondents (44.7%) uses MTN as their main network provider, followed by Tigo (20%), Airtel (19.3%), Vodafone (14.4%) and Expresso (1.7%). Apart from MTN and Expresso figures which were (45%) and (1.6%) respectively, the results for the rest are quite different from what was reported by the telecom regulator. The Tigo, Airtel and Vodafone figures reported by NCA are 15%, 12% and 20% respectively. The availability of the provider's network in areas where we collected the data may explain the differences in the figures. However, it is necessary to note that contrary to most countries, the incumbent telecom company (Vodafone erstwhile Ghana Telecom) has less than 50% the number of subscribers of the largest mobile company in Ghana (MTN).

2.4.5.3. Multiple SIM Card Ownership and Expenditure

There were nearly as many multiple SIM card owners as there were single SIM card owners, and about 42% of the survey respondents reported having two or more active SIM cards. The use of multiple SIM cards has become part of the pre-paid subscription environment in Ghana. From table 2.2 above, four respondents reported having SIM cards from all five MNO whiles 52 respondents have access to four SIM cards from four providers. In Ghana, even consumers of company post-paid subscription may have a pre-paid SIM along side. Subscribers choose to have multiple SIM cards to take advantage of promotions on in-network calls, which lessen their overall cost of making calls. It has to be noted that aside the multiple SIM Cards for voice call, certain users have additional SIM for broadband services.

Pre-paid SIM cards are particularly often provided freely by MNOs or at an exceptionally low cost to attract consumers from other networks. Subscribers realized that one could make a lot of free and cheap calls if one makes in-network calls. Generally, family and friends keep their old network provider numbers for incoming calls and acquire new SIM cards from the network of friends and family. Further, the influx of mobile devices that can take more than one SIM card and users can switch between SIMs without restarting the mobile has also contributed to the rise of consumer's using multiple SIM cards.

Table 2.2 Multiple SIM Cards

	Frequency	Percent	The Cumulative Percent
MTN	286	28.4	28.4
Tigo	121	12.0	40.4
Airtel	86	8.5	48.9
Vodafone	84	8.3	57.2
Expresso	10	1.0	**58.2**
MTN, Expresso	1	.1	58.3
Tigo, Expresso	3	.3	58.6
Airtel, vodafone	32	3.2	61.8
MTN, Tigo	123	12.2	74.0
MTN, Airtel	64	6.3	80.4
MTN, Vodafone	31	3.1	83.4
MTN, Tigo, Airtel, Vodafone,	52	5.2	88.6
Airtel, Expresso	9	.9	89.5
MTN, Tigo, Airtel, Vodafone, Expresso	4	.4	89.9
MTN, Tigo, Airtel	14	1.4	91.3
Tigo, Airtel	53	5.3	96.5
Tigo, Vodafone	26	2.6	99.1
Tigo, Airtel, Vodafone	6	.6	99.7
MTN, Tigo, Expresso	1	.1	99.8
MTN, Airtel, Vodafone	2	.2	100.0
Total	1008	100.0	

The introduction of personal pre-paid charge model has been acknowledged in literature as the source of a real breakthrough of the mobile telephony in Africa since it does not require monthly payments, but make payment dependent on usage (Sey, 2010 p. 119). Pre-paid subscriptions are appealing to people with lower or irregular incomes for their use does not require a bank account, a physical address, a postal address or a minimum monthly subscription fee (Gillwald, 2005, p. 23). As shown in Figure 2.4, 95.6% of the respondents are on a personal pre-paid charge model. Until

recently post-paid subscriptions were limited to Vodafone and MTN subscribers, although post-paid have higher ARPU than pre-paid. Where the MNO's service plan includes post-paid services, they were directed to larger corporate and government institutions, not personal post-paid services. For example, MTN, Airtel and expresso describe their post-paid services as VIP services. The major challenges to the MNOs regarding the provision of personal post-paid services are the risks involved. Most developing countries including Ghana have a deleterious postal address system and large informal sector, which makes it difficult to find unpaid post-paid subscribers. Thus, the rate of personal post-paid subscribers (2.0%) compared to corporate post-paid subscribers (1.6%) found in this survey were quite intriguing, which could mean that there is a renewed drive from the MNOs to attract more post-paid subscribers.

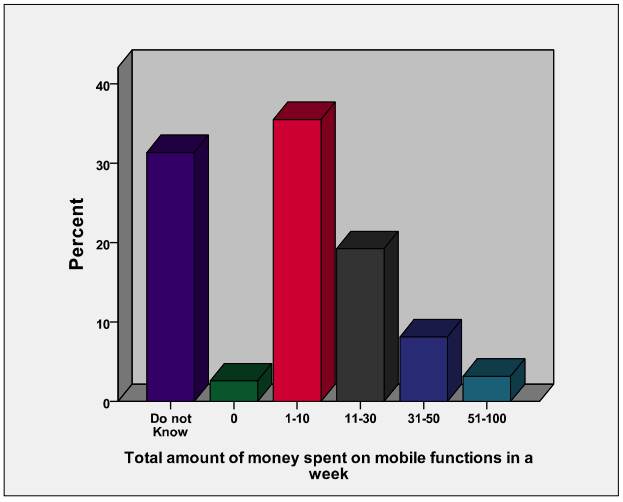


Figure 2.5 Total amount of money spent on mobile in a week

Table 2.3 Total amount of money spent on mobile functions in a week

GHc	Frequency	Percent
Do not Know	316	31.3
0	26	2.6
1-10	358	35.5
11-30	194	19.2
31-50	82	8.1
51-100	32	3.2
Total	1008	100.0

The results from the survey (Table 2.3) indicate that over 31% of the respondents do not know how much they spend on mobile functions in a week. This could be explained by the sporadic nature of pre-paid airtime usage. Pre-paid customers buy airtime either through a scratch card or unit transfer as and when they have money to buy. To attract the extremely low income, scratch cards sell for as little as GH₵ 1. With a GH₵1 scratch card, consumers can take advantage of a free night in-net calls and other promotional services. However, 54.7% reported spending between GH₵1 to GH₵30, whilst 2.6% spends nothing in a week. Sey (2010) reported that in order to conserve airtime users resort to constant flashing (generating missed calls, and expecting callback), free night calls

and making off-peak calls. When asked to further breakdown their weekly expenditure to voice calls, SMS, internet and content, on average 70% of the respondents answered "Do Not Know". For the majority pre-paid service consumers, it is almost impossible to assess the proportion of their mobile phone expenditure that goes into the various mobile services. The charges for the use of value added services are not made as explicit as charges for voice services.

2.4.5.4. Mobile Handsets

The mobile handset market in Ghana like most developing countries is characterized by a combination of secondary handset market, fake regular brands and new handsets from US, Europe and China. The increasing replacement trend in the developed world is a terrific boost for the secondary handset market in the developing world. The secondary handset market typically takes place through two different ways: informal transactions and structured channels. Informal transactions occur by individuals who travel to US and Europe to collect the used handsets and export them to their home countries. The refurbishing companies are the most notable case of a structured channel. These companies collect used handsets in developed markets – mostly in the US and Europe and take them to developing countries, usually reselling them through mobile phone distributors and operators.

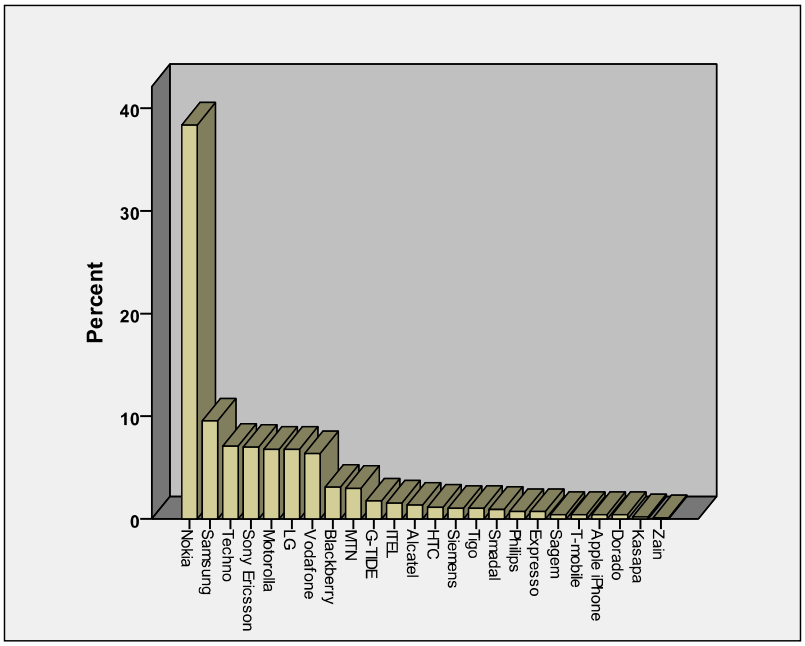


Figure 2.6 Mobile Handset Brands in Ghana

Regarding the mobile handset brands, there were 24 different brands identified from the survey as shown in Figure 2.6. The first six brands made up 75% of the total number of brands. The biggest brand from the study was Nokia with 34% of the respondents using Nokia mobile handsets. This was followed by Samsung (10%), Techno (7.1%), Sony Ericsson (7%), LG (6.8), and Motorola (6.8%). Nokia's lead could be partly attributed to the secondary handset market and partly due to the fake Nokia phones from China. The Nokia brand is the most popular mobile handset brand in Ghana. However, an observation of different handsets used in Ghana shows that the Nokia brand is the most cloned brands in the mobile handset market. The second position held by Samsung is an indication of the increasing image of the Samsung brand across the developing countries. Techno mobile handset from Hong Kong has gained the third position by focusing on the developing countries' need for multiple SIM card handsets. They created a range of multiple SIM card products, which attracted subscribers with two or more networks. G-TIDE, Smadal, and Dorado are a few nontraditional handset brands that emerged from the study. Techno, G-TIDE, and Smadel handsets are all China branded phones that provide multimedia capabilities at low price. For example, the Techno T9 product provides the full multimedia functionality (including, MP4 player; 3MP camera, Bluetooth, FM radio, WAP2.0/GPRS class 12, video recorder) with high definition, Dual SIM dual standby, and several applications for less than $120. Recently, Nokia and Samsung have both developed multiple SIM card handsets for the emerging markets.

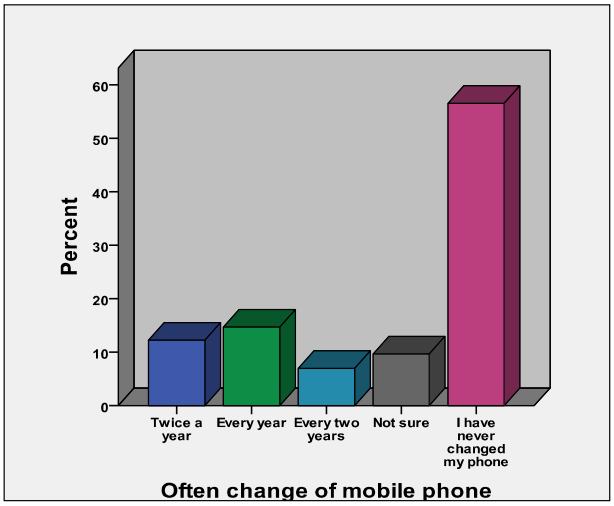


Table 2.5 Change of mobile handset

	Frequency	Percent	Cumulative Percent
Twice a year	123	12.2	12.2
Every year	148	14.7	26.9
Every two years	70	6.9	33.8
Not sure	97	9.6	43.5
I have never changed my phone	570	56.5	100.0
Total	1008	100.0	

Figure 2.7 Change of mobile handset

As expected, most of the respondents have more than one mobile handset, with 93.6% reporting to have two or more handsets. Also, when asked, "how often do you change your mobile phone?" 55% responded never and 27% changes the handset at least once every year. Although the global trend of mobile handset upgrading could be higher, this high rate of never changed mobile phone could be partly due to the nature of pre-paid services and partly because of the newness of respondents mobile usage.

The last item of the questionnaire regarding mobile handsets sought to understand the factors that influence the respondents' purchase of mobile handset. The results show that there are several different, important factors, and their severities are about the same. The most essential factor found to influence a consumer's decision to purchase a particular handset was advertisement, which over 27% of the respondents expressed. The second was "observation from people". Recommendation from a family member was also an influential factor in deciding which mobile device to purchase. Figure 2.7 provides the full picture. This explains the massive TV, radio and billboard advertisements of mobile devices that one finds in Ghana.

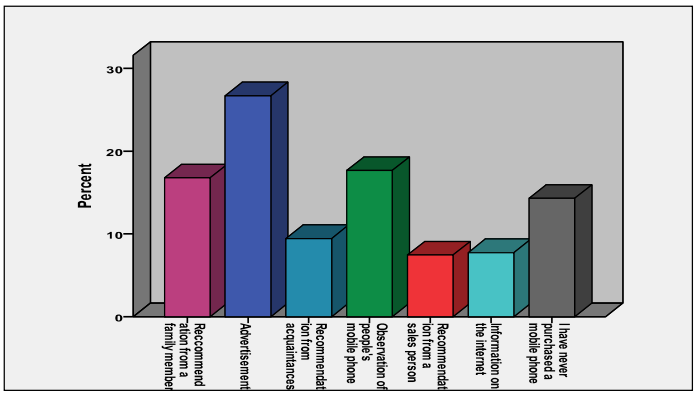


Figure 2.8 Factors that influence purchase of mobile handsets

2.4.5.5. Mobile Use as an Interpersonal Communication Device

The mobile phone as a social device is fundamental to its diffusion and adoption. As a social device, it provides for the individual's need for social interaction that represents the need for communicating with friends, family and affiliations such as church and clubs (Sey, 2011). To understand a mobile society, it is imperative to access the individual's rate of use of the basic communication functionalities of the mobile device. Their rate of use determines their dependency

on the device (Sey, 2010). The higher the rate of consumption, the more dependent a society is on the interpersonal communication device. For most people in Ghana, the mobile phone is their first encounter with an interpersonal communication device. Prior to mobile phones, individuals travel long distances to pass on information to family, friends and other relations.

Table 2.6 Usage of mobile phones for voice calls and SMS

	Receive Voice Percent	Make Voice Percent	Receive SMS Percent	Send SMS Percent
Over 20 times a day	24.3	19.4	7.1	7.1
10-20 times a day	35.3	24.4	11.3	7.7
5-9 times a day	23.3	27.5	22.5	16.0
1-4 times a day	7.7	18.0	25.2	29.1
Several times a week	8.2	9.1	19.5	21.8
At least once a week	.6	1.1	6.1	6.1
More seldom	.0	.0	4.7	6.9
Never	.5	.5	3.6	5.4
Total	100	100	100	100

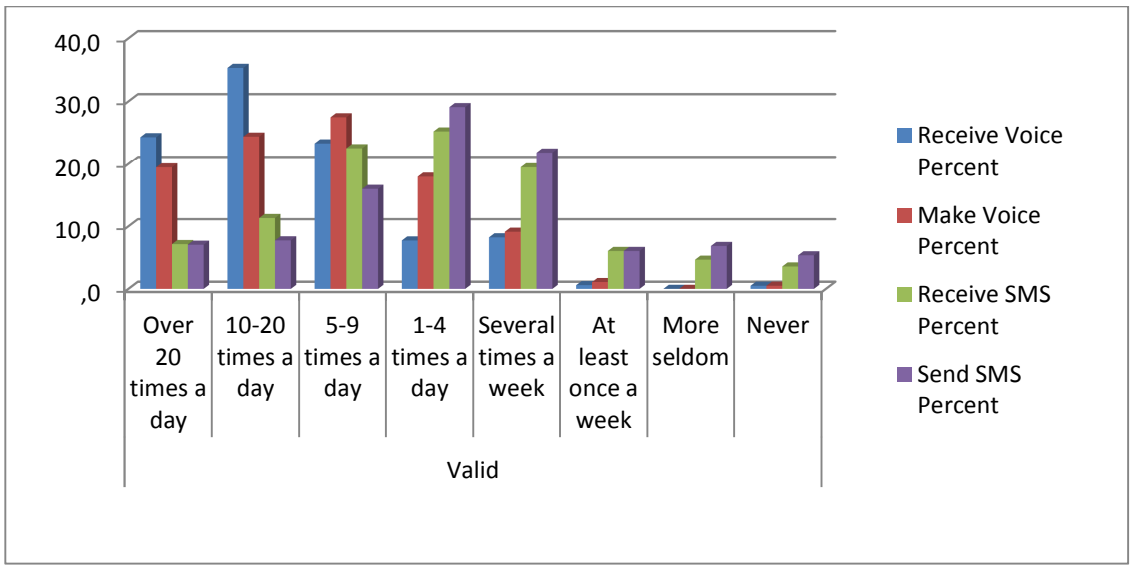


Figure 2.9 Usage of mobile phone for voice calls and SMS

The results of the survey show that two out of every five people makes at least a phone call in every two hours of the working day, whiles one out of every two people receives at least a call in every two hours of the day. Furthermore, cumulatively, nine in ten people receive at least one phone call in a day. More remarkably, only five out of 1000 people never receives or makes a phone call. Also, four out of ten people receive at least 5 SMS in a day, whereas only three out of ten people send at least 5 SMS in a day. These results reflect the Ghanaian society's dependency on

mobile phone for interpersonal communication. Although it indicates a relatively high use of SMS, voice is still supreme in Ghana. Respondents were asked to provide the average length of time each call takes, to assess the significance of the calls.

Table 2.7 Average time spent on calls

	Average Time Percent	Cumulative Percent
Less than 1 minute	5.7	5.7
1-4 minutes	31.7	37.3
5-9 minutes	23.2	60.6
10-29 minutes	16.4	77.0
30-60 minutes	16.5	93.4
More than 1 hour	6.6	100.0
Total	100.0	5.7

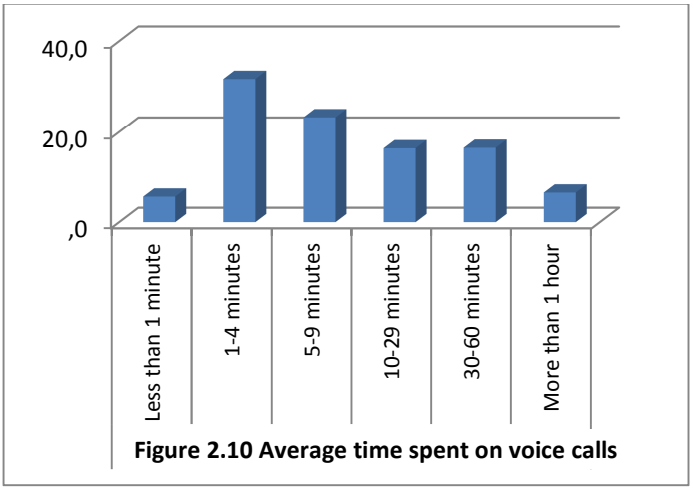


Figure 2.10 Average time spent on voice calls

The results support the earlier assertion that the Ghanaian mobile society is dependent on the mobile as an interpersonal communication device. From Table 2.6, four in every 10 people spends at least 10minutes on the average call. Combining the two findings, the results indicate that four in every 10 people spend one hour and 40mins a day making phone calls. Mobile phones have gained a significant position in the lives of many Ghanaians.

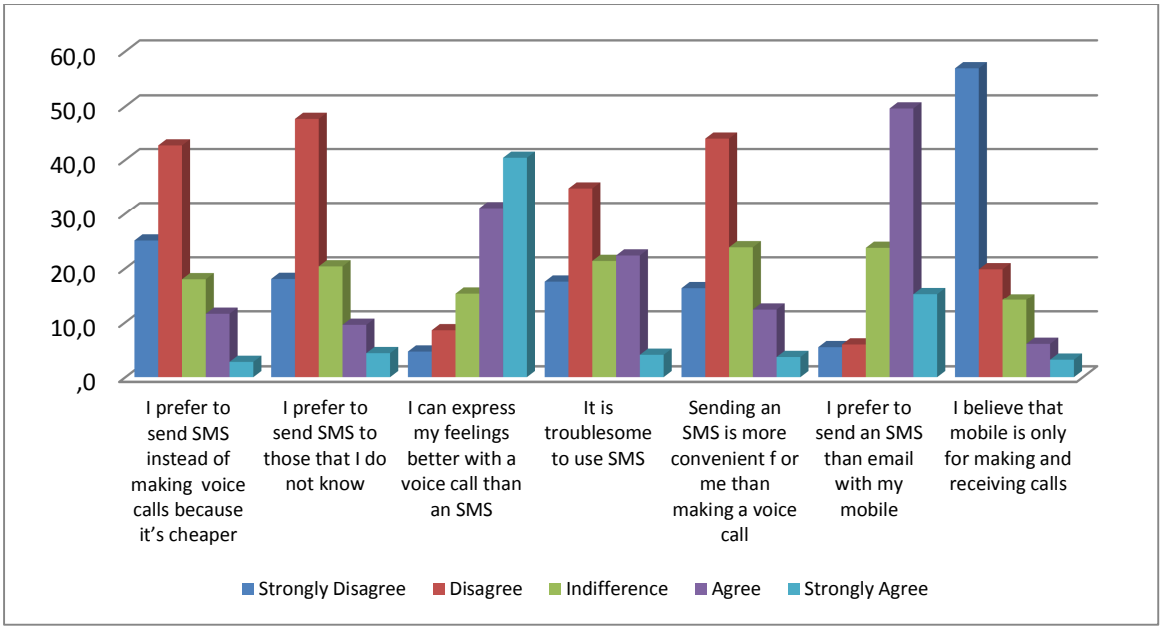


Figure 2.11 Mobile Phone usage and perceptions

Table 2.8 Mobile Phone usage and perceptions							
	I prefer to send SMS instead of making voice calls because it's cheaper	I prefer to send SMS to those that I do not know	I can express my feelings better with a voice call than an SMS	It is trouble some to use SMS	Sending an SMS is more convenient f or me than making a voice call	I prefer to send an SMS than email with my mobile	I believe that mobile is only for making and receiving calls
Strongly Disagree	25.0	18.1	4.7	17.6	16.4	5.5	56.9
Disagree	42.6	47.7	8.5	34.7	43.9	6.0	19.8
Indifference	18.0	20.3	15.4	21.3	23.8	23.7	14.1
Agree	11.5	9.5	31.1	22.3	12.3	49.6	6.1
Strongly Agree	2.8	4.4	40.4	4.1	3.7	15.3	3.2

An Ofcom study on the communication market of the UK in 2011 revealed that SMS has overtaken voice in interpersonal communications. Whiles on average 58% of the population send at least one SMS text per day, only 47% made a daily mobile call (Ofcom, 2012). It said the shift away from traditional methods of reaching friends and family was being led by young people aged 16-24. The results from this study show the opposite, six out of ten people seem to prefer making calls for sending an SMS in most situations. Seven out of ten believe that they can express their feelings better with a voice call than an SMS. This is culturally significant since the Ghanaian culture is highly expressive. People want to be heard. Although it is possible to argue that the level of education and the maturity of the technology are contributing factors to these results, this could be attributed to a cultural influence than technology and education. Only one in ten believes, that mobile is only for making and receiving calls.

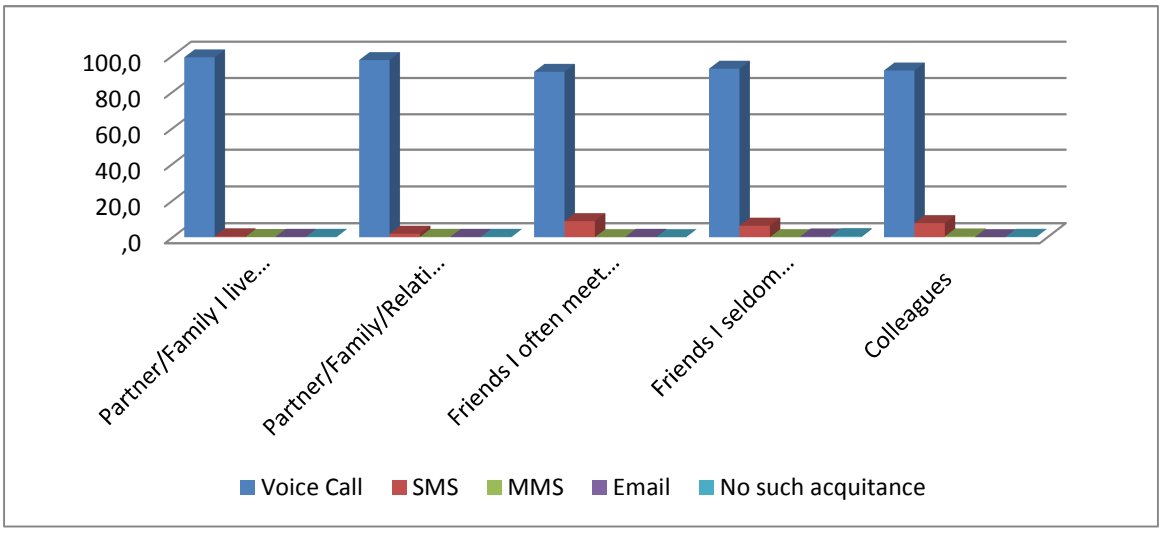


Figure 2.12 Mobile functions used for communication with different acquaintances

Table 2.9 Mobile functions used for communication with different acquaintances

	Partner/Family I live with	Partner/Family/Relative I do not live with	Friends I often meet in my everyday life	Friends I seldom meet in my everyday life	Colleagues
Voice Call	99.0	97.5	91.1	92.8	91.8
SMS	.5	1.9	8.7	6.3	7.6
MMS	.1	.2	.0	.0	.4
Email	.2	.2	.2	.4	.0
No such acquaintance	.2	.2	.0	.6	.2

In support of the earlier assertion that the expressiveness of the Ghanaian culture influences their use of the various functions of the mobile phone, an average of nine out of ten preferred voice call to all other functions with communicating with different acquaintances. Interestingly, for those using SMS, they prefer sending text to friends and colleagues and not family. The use of SMS is noted to be greatest among young people (Bohlin, Olsson, & Westlund, 2008). Also, the Ofcom report said the shift away from voice calls to SMS is led by young people aged 16-24. Therefore, given that 72% of the respondents of this survey are aged below 30 years, much SMS preference was expected.

The use of certain functions of the mobile can be situational. The use of certain functions may not be socially acceptable or could be banned by law. For example, in many countries including Ghana, using the mobile phone whiles driving is illegal. Whereas not answering a phone call in a lecture hall will be out of courtesy. Thus, legal, social and cultural practices do affect the usage of mobile phone.

Table 2.10 Usage of mobile in different situations

	When at home	When driving	When I am a passenger in a car or taxi	When on a bus or train	When riding a bike or cycle	When I'm shopping	When studying (not in a class or lecture)	When at class or lecture	When waiting (e.g. bus or a friend)	When taking a walk	When sporting or at leisure
Voice Calls	43.7	14.9	25.6	22.7	11.3	20.4	12.5	8.1	39.0	26.8	18.4
SMS/ MMS	2.7	3.8	5.9	5.9	3.5	3.3	7.6	5.8	3.0	2.4	2.4
Internet Surf	21.8	.6	12.5	12.1	.8	0.8	1.8	3.0	16.1	1.5	12.8
News Services	.7	.2	.3	.3	.4	0.5	.2	.5	.4	.5	.1
MP3 / radio	17.9	4.4	18.6	17.6	4.1	42.9	23.4	1.1	19.1	35.6	14.5
Not Relevant for me	3.2	53.2	6.8	12.9	53.9	14.1	29.8	32.5	7.7	8.9	14.9
Do not use the mobile then	10.1	22.9	30.4	28.6	26.0	18	24.7	49.0	14.8	24.3	37.0

Respondents were asked to indicate the function of a mobile phone that they are most likely to use in eleven different situations. The results point out that in all situations identified most Ghanaians will prefer making a voice call to sending an SMS. Interestingly, even in a lecture hall or when driving, more respondents prefer voice calls to SMS. However, the use of the MP3 or radio was significantly higher than SMS in places where solitude is required. Further, using the mobile for Internet surfing was surprisingly higher than SMS in all situations. In addition, in most cases, one in two believes that they either make a voice call or "do not use the mobile then", confirming that the mobile phone is still seen by many as only a voice communication device. Although respondents perceive that the mobile phone is more than just a voice communication device, their actual usage is mainly for voice communication. Despite all the advantages of using SMS captured in literature, the Ghanaian mobile society prefers making voice calls for sending SMS (Geser, 2004 p.19). However, the Ghanaian's preference of voice over SMS will change over time. Similarly, texting did not take off in America until the beginning of 2008, several years after it was introduced.

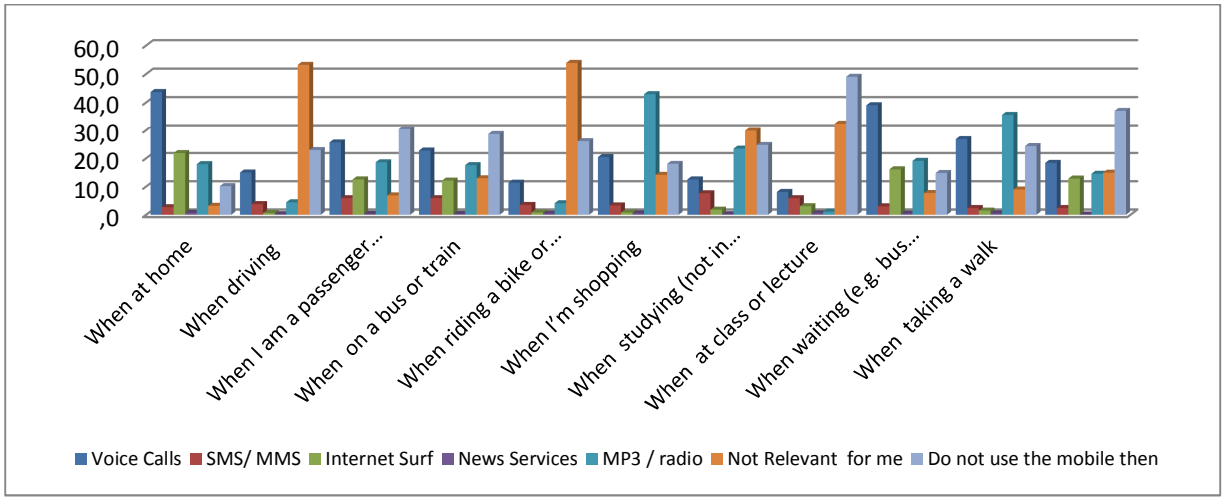


Figure 2.13 Usage of mobile at different situations

2.4.5.6. Using Mobile Phone as a Multimedia Device

The multimedia capabilities of mobile phones continued to evolve over the last few years. The revolution can be partly attributed to the advancement of the third and fourth generation mobile telecommunications and partly of audio and video applications made popular through other devices. It is also because of advances in technology that allows for cost-effective miniaturization. Continuous advances in silicon technology leading to increases in processing performance of CPUs;

better Dynamic RAM (DRAM); large and bright color displays; improved cameras and imaging technologies and video streaming and compression capabilities have all contributed in making the mobile phone a multimedia device (Rasmusson et al. 2004). Furthermore, the multimedia functionalities are combined with significantly reduced size, weight, better energy consumption, price and user friendly interfaces, which makes it easier to use by young children (Ling 2004, Geser, 2004). Why carry a MP3/MP4 player and a mobile phone when your mobile device can provide both applications?

Table 2.11 Usage of Mobile Phone as a Multimedia Device

	Daily	6-7 times /week	2-5 times /week	At least once /week	At least once /month	More seldom	Never, but I would like to	Never, and I would not like to
Take Pictures	12.7	6.1	14.2	17.7	5.0	8.6	29.3	6.5
Listen to MP3	37.5	6.5	3.5	7.4	3.3	7.5	28.5	5.8
Listen to Radio	32.5	4.6	9.2	6.8	3.8	7.9	28.2	6.9
Listen to Radio News	30.0	4.1	9.6	6.9	3.4	9.7	29.7	6.6
Play games	32.7	10.9	8.9	7.9	3.1	10.5	15.2	10.7
Use the calendar function	37.4	15.4	6.4	6.4	4.1	9.0	14.3	7.1
Make Notes	17.9	7.8	7.5	11.0	2.5	12.0	31.2	10.0
Record video clips	6.0	2.5	3.8	14.3	9.6	16.3	38.4	9.2

The respondents were required to express their usage of the multimedia functions of their phones. Eight different functions were identified, and they were required to provide information on their usage intensity. The results illustrate that apart from the recording of video clips, most functions are well adopted in Ghana, with more than three in ten people Listening to MP3, Radio, Radio News, play games and use the calendar functions daily on their mobile phones. A further analysis points out that one in every two people use these functions at least once a week. More than that, most of the respondents who do not currently use these functions looked forward to using them in the future. The most desired functions among the non- users are recording of video clips, listening to radio news, and listening to MP3. Contrasting these findings with the results of the mobile barometer 2007 survey, the Ghanaian mobile society is more interested in using the multimedia functionalities of the mobile phone than the Swedish (Bohlin et al. 2008). This could be explained by the lack of alternative devices, which makes the use of mobile devices a substitute to other multimedia devices.

The study also contains questions about the advanced mobile services that have emerged because of having Internet on the mobile phone. Respondents were required to express their usage of mobile Internet, search Engines, Email, watch video, view News site, weather forecast, sports results, stock exchange information, mobile Banking, GPRS and mobile payments. For services like mobile Internet browsing, search engine (google) and Email, an average of 43% of the respondents use these services at least once a week. Since the introduction of 3G and 4G mobile technologies, a number of people in the mobile society of Ghana see the mobile Internet as an alternative to going to the internet cafe or other limited access to the Internet. For many people in this society, mobile internet is not a complimentary service, but a substitution to access the internet through the mobile device. Interestingly, the majority of the respondents who have never used any of these services seem to like to use them.

Table 2.12 Usage of advanced and internet related services

	Daily	6-7 times /week	2-5 times /week	At least once /week	At least once /month	More seldom	Never, but I would like to	Never, and I would not like to
Mobile Internet (e.g. GPRS, 3G)	23.5	11.8	6.0	5.3	2.6	3.2	36.5	11.2
Search Engine (e.g. Google)	18.6	12.2	8.4	5.4	2.0	3.8	37.4	12.3
Email	18.4	12.3	7.4	4.9	2.1	3.7	39.3	11.9
Watch video (incl. Mobile TV)	6.3	3.6	5.5	11.9	3.9	5.5	50.2	13.2
View News site	11.3	10.6	7.8	7.0	2.2	5.3	43.6	12.2
Weather Forecast	8.4	4.4	8.6	5.9	2.3	5.9	49.2	15.3
Sports Results	19.0	5.8	2.2	1.3	2.9	5.4	42.5	21.1
Stock exchange info	5.3	3.1	6.4	5.3	4.3	6.6	46.3	22.7
Mobile Banking	1.3	0.9	0.7	10.0	5.9	3.4	53.4	24.3
GPS, Maps or Navigation Service	2.0	0.6	3.2	5.8	5.1	8.7	53.5	21.2
Mobile Payments	1.7	0.4	0.5	9.5	5.9	4.8	54.3	23.0

2.4.6. Mobile Technology Use in Kenya

In this thesis, account on Kenya mobile usage is not supposed to provide a comparison study on that of Ghana since it is not an objective of this thesis to compare the mobile services usage of the two countries. As explained later in the methodology section, the inclusion of Kenya in this study

was for the purposes of having rich mobile money usage data. However, it is believed that the description of the mobile society of Ghana provided above will be quite similar to that of Kenya.

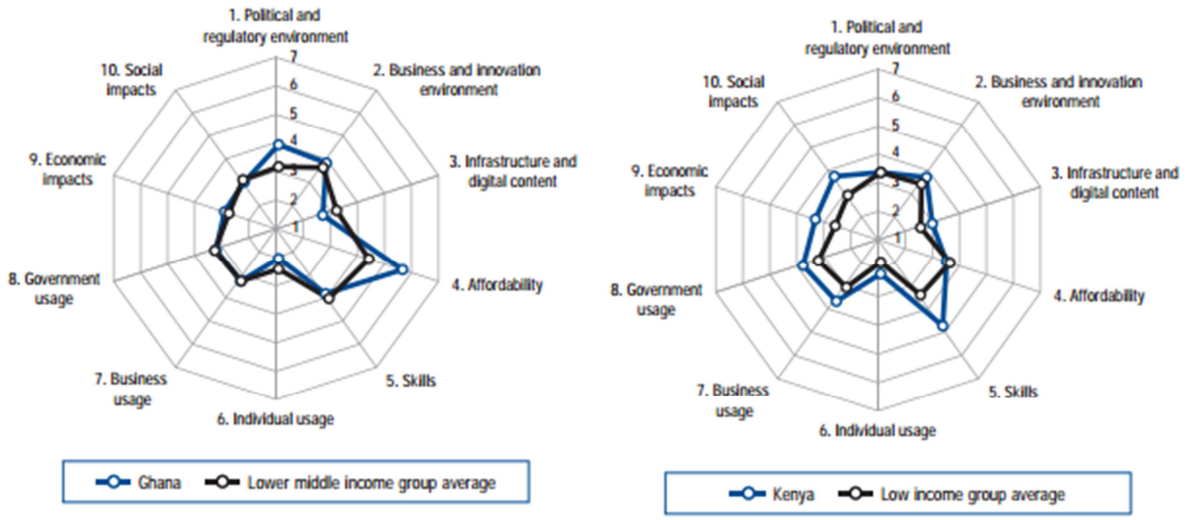


Figure 2.14: Kenya vrs Ghana - ICT Comparison

The Global Information Technology Report published by the World Economic Forum provides some comparative analysis of the levels of ICT in 142 countries across the world using 53 indicators sub-grouped into 10 key groups shown in figure 2.14 above. The overall Network Readiness Index 2012 shows great similarities between the two countries with Ghana scoring 3.4 whilst Kenya scores 3.5 (Dutta & Bilbao-Osorio, 2012). However, in relation to the current study, there a few differences between the two countries that are worth noting: Whereas Kenya has 89% mobile network coverage, Ghana only has 77%, meanwhile the cost of using mobile communication in Ghana is less than 50% (0.12) of the cost of using the same service in Kenya (0.29). Further, the report indicates slight differences between the social and economic impact of ICT in Kenya and Ghana. The impact of ICT on access to basic services was 4.6 in Kenya and 3.9 in Ghana. This could be partly explained by the differences in adult literacy rates (Ghana, 66.6% and Kenya, 87%).

Thus, as stated earlier, the contextual account of the mobile environment of Kenya is simply based on reports and some existing literature. Kenya was not left out in the spread of mobile technology in Africa (Javier Ewing et al., 2012). Since its telecommunication liberalization in the 1990s, Kenya has enjoyed a steady growth of its mobile subscription base. The number of subscribers in Kenya exceeded 25 million in June 2011 representing over 64% of the total population (CCK, 2012). This characterizes a sharp increase from 2009 when the total subscribers were reported to be just over

16 million, enjoying a year-on-year growth of over 25%. As with most developing countries, the majority of the subscribers i.e. over 99% have prepaid subscriptions. The plummeting handset prices (current low price of $20) and the prepaid schemes are argued as the main factors that have instigated this growth in Kenya's mobile market. The use of prepaid schemes allows individuals to purchase small denominations of airtime credit. This is particularly convenient for the poor user since they can adjust the usage to suit their erratic patterns of income (Morawzcynski, 2011).

There are currently four mobile network operators i.e. Safaricom, Airtel, Essar Telecom and Telkom Orange. Safaricom has the largest market share of 68.6% followed by Airtel (14.3%), Telkom Orange (10.8%) and Essar Telecom (6.3%). The four mobile network operators have engaged in a battle for new customers and retention of existing ones, which has led to a reduction in prices and improved infrastructure (Morawzcynski, 2011). For example, in 2010, the Average Revenue per User (ARPU) per month reduced to KES 348.94 from KES 389.00 in 2009 because of reduced calling rates (CCK, 2012). Further, the competition among the MNOs led to a quest to find innovative ways to retain customers and possibly increase revenue. One of such innovations is Mobile Money.

To further increase competition, the Kenyan regulator introduced mobile number portability in April 2011. The annual report of the regulator also specifies that the number of internet subscribers in Kenya had risen from 7.8million to 12.5million. This increase is influenced by the rise in mobile internet subscriptions.

3. Theoretical Perspectives

3.1. Introduction

The previous chapter presented the contextual information on the phenomenon and placed it within a broader frame of the adoption and use of mobile data services in a developing country context. The overall theoretical objective of this research is to develop a model that will enable understanding, at the individual user level, of the consumer adoption decision-making process. Such knowledge will fill the gaps in explaining some of the paradoxes that exist in the current information systems acceptance, use and adoption literature. This chapter presents the theoretical framework, which is formed by an in-depth review of the extant literature on the phenomenon of interest. This framework forms the theoretical basis of the entire study; however, it is subject to reconstruction, modification, refinement and expansion by the end of the dissertation.

The technology acceptance, use and adoption of mobile data services have long been at the pivot of mobile research in the IS field. Researchers from several other disciplines such as anthropology, sociology, psychology, media and communication, innovation and marketing have contributed to it from different perspectives. Theories and models have been developed, modified and extended to capture all these perspectives of technology acceptance at different levels of analysis and relevance (Venkatesh, 2006). Different foci and underlying assumptions within each perspective direct how, what form and at what level of understanding of technology acceptance use and adoption can be derived. Although, several attempts have been made to extend knowledge in the theories of technology acceptance and adoption as posited by Bagozzi, (2007), they are only broadened but not deepened by introducing additional predictors. He stressed that such broadening of the theories only makes them unwieldy and conceptually impoverished. In addition, he called for extensions to the TAM that deepens the understanding of technology acceptance and adoption (p. 244). Although, this and other similar calls have been made in information systems research for richer theorizing of technology acceptance and adoption concepts; little research has actually been done at the individual level compared with the organizational level (see Jasperson, Carter, & Zmud, 2005; Venkatesh, 2006 p. 498; Weber, 2003). Specifically, Johns (2006) posits that where the technological/contextual factors are not properly considered, we will not understand the person-situation interactions (p. 388). Thus, the aim of this part of the thesis is to heed the call and provide

insights that will hopefully increase the understanding of the mobile consumer and his or her acceptance, use and adoption of mobile data services. Moreover, many researchers and evaluators will judge the quality of this dissertation based on its theoretical contributions.

In building this theoretical framework, we take inspiration from Weber's definition of theory as, *"an account that is intended to explain or predict some phenomena that we perceive in the world"* (Weber, 2003 p. iv). Thus, the aim of this theoretical framework is to provide an explanation of the acceptance, use and adoption of mobile data services specifically mobile money. In this regard, the framework focuses on key technology acceptance, use and adoption concepts in information systems and the relationships among the concepts as the basic building blocks of the framework (J. A. Maxwell, 1992).

To develop the theoretical framework, this chapter proceeds by first providing definitions of key concepts in mobile data services technology acceptance, use and adoption; explain theoretical approaches used; triangulation perspectives adopted; and expound on the key relationships between the concepts.

3.2. Key Concept Definitions

One of the principal steps identified by Weber (2003 p. vii) in making a theoretical contribution is articulating the key concepts that make the theory or framework. In this thesis, the key concepts identified for a proper understanding of the theoretical framework are technology acceptance, use and adoption. Other concepts may be introduced later. Research on technology acceptance, use and adoption of either mobile data services are pursued independently or interchangeably using a variance approach. Although conceptually close, there are fundamental differences between them that need to be captured in order to advance existing theories. For example, a primary assumption in existing IS research is the link between behavioral intentions and actual behavior, which translates into intention to use and actual use (Ajzen & Fishbein, 1980). Bagozzi (2007, p.245) criticized the blanket acceptance of this assumption and call for an investigation into the link (e.g. Chau & Hu, 2001). He stressed that forming an intention to use does not necessarily lead to actual use and that it requires further investigation. In addition, a scan through the IS literature on

technology acceptance, use and adoption reveals an arbitrary application of these terminologies without concise definitions or conceptualizations.

Another challenge in IS literature is the link between use and adoption. With the exception of, a few researches that study both adoption and use (Al-Natour & Benbasat, 2009; Campbell & Russo, 2003), most research pursues them independently with greater focus on adoption than use. This has led to calls for research on the use of mobile data services. However, in practice, the adoption goes hand in hand with the use (both initial and continuous use). An initial use also known as experimentation (Sarker & Wells, 2003) leads to the adoption, which then leads to actual (continuous) use. Neither adoption nor continual use is an end in the process of adoption of its own. The more a consumer uses a product the more adoption takes place and vice versa. Combined research on adoption and use will provide a better understanding of the phenomena under study.

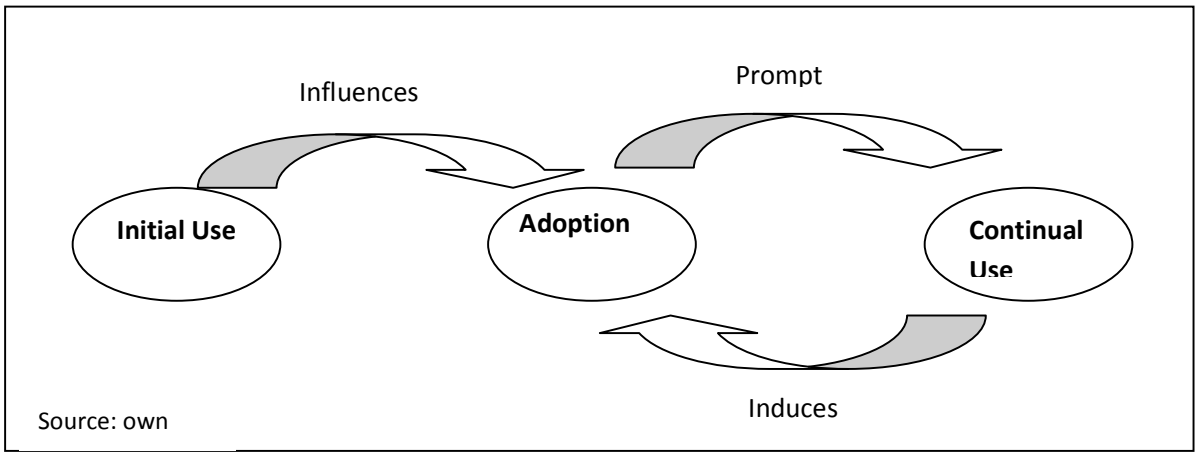


Figure 3.1 Relationship between use and adoption

For many researchers, technology acceptance equates technology adoption. Moreover, the concepts are used interchangeably (see Agarwal & Prasad, 1998; Mathieson, Peacock, & Chin, 2001). Further, the focal construct in these studies changes from adoption to technology acceptance without warning. Variety of dependent variables have been employed, including usage (Moon & Kim, 2001), intention to use (Agarwal & Prasad, 2000), continued usage (S. S. Kim & Malhotra, 2005). Does technology acceptance mean technology adoption? If not, what is the difference? To answer these questions we first look at the various definitions of technology

acceptance and adoption given in the literature. In order to ensure that the original meanings are not lost we look for the meaning as far back as possible.

Table 3.1 Basic Definitions of Technology Acceptance and Adoption

Concept	Definition	Reference
Adoption	A decision to make full use of an innovation as the best course of action available	Rogers, 1995 p.21
	The degree to which the prospective adoptive expects the technology adopted will be free of efforts regarding the adoption process and utilization	(Phillips, Calantone, & Lee, 1994)
	Adoption is defined as the intention, initial decision, or action to try or employ an innovation or evidence-based practice.	(Proctor et al., 2011)
	The acceptance and continuous use of a product, service or idea	(Sathye, 1999)
	A process – starting with the user becoming aware of the technology and ending with the user embracing the technology and making full use of it.	(Renaud & Van Biljon, 2008)
Technology Acceptance	An individual's psychological state with regard to his or her voluntary or intended use of a particular technology.	Chau and Hu, 2002
	Defined as the degree to which individual users use a given system when usage is voluntary or discretionary.	(Casanovas, 2010)

After carefully going through a number of technology acceptance and adoption studies, Rogers definition of adoption was found to be the most cited definition, which is *"a decision to make full use of an innovation as the best course of action available"* (Rogers, 1995). It was also defined by the Macmillan dictionary, as *the decision to use or accept a particular idea, method, law, or attitude.* What was common and obvious in the definitions of adoption found in the literature was the word "use". Although that does not make them synonymous, it reveals the intrinsic relationship between them (adoption and use). For the purpose of this study, we adapt Renaud and Biljon's (2008) definition and define adoption as a process, which starts with the user accepting the technology, utilizing it and ending with it becoming, embedded in his or her everyday life. By this definition, we agree with Rogers that the best course of action is the one that accepts the use of the technology as the only way to perform an action.

Moreover, technology acceptance was mostly defined as *"an individual's psychological state with regard to his or her voluntary or intended use of a particular technology"* (Chau and Hu, 2002). Thus, technology acceptance is a stage in the process of adoption. The acceptance of a technology should not equate an adoption; however, it is a critical step in the adoption process since the adoption and usage of technology depends on the psychology of user acceptance. From the definition, technology acceptance leads to an intention to use and should be regarded as such.

Thus, factors that influence the consumer technology adoption process that lead to the formation of an intention to use is regarded as part of technology acceptance.

3.3. Theoretical Approaches

As Information System researchers respond to the call of building theories, they will inevitably be confronted with the choice of what theoretical approach to use, and how to use it (Burton-Jones, McLean, & Monod, 2011). Theoretical approach is defined in this context as the choices of the types of concepts and types of relationships that a researcher uses to construct their theory (Robey & Boudreau, 1999). The choice of a theoretical approach determines the structures (the researcher's conceptions of the nature and direction of causality) that one uses in theorizing about a phenomenon. Sound theoretical structures will lead to better theory (Markus & Robey, 1988). In this regard, this section seeks to explain the various approaches to theory in IS and then explicate the choice of approach for this research. In Information Systems, there are three distinct theoretical approaches identified in literature i.e. Variance approach, process approach and systems approach (Burton-Jones et al. 2011 p. 5). Although all three approaches are applied in this thesis, for theoretical contributions, only two of these approaches; variance approach and process approach are considered. They are the most referenced approaches to deriving conceptual models (Webster & Watson, 2002) and relevant to the theoretical framework. The variance/process distinction was created from Mohr (1982) seminal work. The application of the business ecosystem concept to describe the relationships between the key actors of the mobile money ecosystem is an example of a system approach.

Variance approaches comprise of constructs or variables and propositions or hypotheses linking them such that they predict the levels of dependent or outcome variables from the levels of independent or predictor variables, where the predictors are seen as necessary and sufficient for the outcomes (Crowston, 2000). A researcher is said to be using a variance approach when he or she describes the properties of entities in the phenomenon of interest as dependent and independent variables. For example, in the theory of planned behavior (TPB), perceived behavioral control, which is a property of the technology, is described as an independent variable and behavioral intention as the dependent variable. This is the most used approach in information systems research (Paré, Bourdeau, Marsan, Nach, & Shuraida, 2008).

Table 3:2 Characteristics of Variance and Process Approaches

Characteristics	Variance Approach	Process Approach
Types of Concepts	Properties of entities that have varying values	Entities that participate in or are affected by events
Outcome	A variable	A discrete occurrence
Assumptions (Causal logics)	The outcome will invariably occur when necessary and sufficient conditions are present	Outcomes may not occur even when conditions are present unless a particular "recipe," involving external directional forces and probabilistic processes, unfolds.
Types of relationships	Variation among values of properties	Sequences among events (typically probabilistic)
Role of time	Irrelevant; Necessary and sufficient conditions can occur in any order	Crucial; Time ordering in which necessary conditions combine is consequential

Adapted from Burton-Jones et. Al (2011) and Soh and Markus (1995)

On the other hand, the process approach explains how an outcome (usually a discrete occurrence) of interest develops through a sequence of events over time (Mohr, 1982). A crucial distinguishing factor is that the events (causes) are necessary for the outcome but not sufficient in themselves, and outcomes are only partially predictable (Crowston, 2000 p.8). The focus of the process approach is on entities participating in events and how an outcome is achieved through the sequence of events involving the focal actor. There is usually an exit as a result of its probabilistic assumption. By probabilistic, it means that the output may not happen even though the events are occurring in the specified sequence. The main advantage of process theory is that it can provide a better explanation for how output and input are related (Crowston 2000).

The variance approach to the adoption and use of information systems research is more common but not necessarily more accurate or better. Most studies on Technology Acceptance adopt the variance approach. This is obvious in the volume of quantitative studies and the application of variance based theories like TAM, TPB and DoI in the extant literature. Markus and Robey (1988) provide a number of advantages of using a process approach. First, they argue that the invariant relationship between outcomes and their antecedents may not be appropriate for all social phenomena. To establish an invariant relationship between an antecedent and its output in human behavior, then the antecedents must lead to the same behavior all the time. This is almost impossible in social phenomena. For example, a user who perceives a technology to be useful and easy to use might not necessarily form a positive intention to use all the time.

Although, the use of a process approach has been encouraged by both Mohr (1982) and Markus and Robey (1988) over two decades ago, the IS literature lacks pure process theories that have been fully tested empirically except an attempt made by Kim (2009). Typical IS theories that used the process approach in theorizing are the decision making processes (e.g. Rogers, 2003) and the domestication process (Silverston and Haddon, 1996) have been contextualized in literature. Although both processes are well established with a number of studies that use parts of it, there is no IS study that we know of that has examined the individual's decision making process or the domestication approach empirically.

Given the nature of the overall research objective stated in chapter 1 and some of the sub questions identified, we temper Markus and Robey (1988) caution about combining the theoretical approaches and adopt a hybrid theoretical approach to this study. The nature of the phenomenon benefits from both the variance and process approaches. Whereas, a consumer's intention to adopt mobile data services could be easily predicted by assessing the relationship between variables; the sequential events that lead to the service becoming part of their everyday life may require an explanation of the mechanisms that are believed to play pivotal roles in affecting technology use and adoption. By adopting both approaches, the hybrid approach, gives us more conceptual tools with which to understand and describe the way that the actors understand and describe their social settings (Burton-Jones et al. 2011). From the variance approach perspective, the study can make use of the extensive conceptualization of technology acceptance constructs in the extant literature in answering the research question 2. The variables that predict a consumer's acceptance of mobile data services have been investigated extensively with various extensions of existing theories like TAM, UTAUT and TPB(H. P. Lu, Hsu, & Hsu, 2005; Venkatesh, Thong, & Xu, 2012). Thus, the technology acceptance model and its derivatives could be used to explain the initial part of the model.

Adoption that involves the continued use of a technology application is not a one-time effort; it involves a certain amount of interactions between the focal actor and the application and some amount of periodic evaluations over time. This requires a process approach to properly theorize how these events unfold. One advantage is how the process approach enables specification of mechanisms and temporal relations among theoretical elements in an extended process. This has

enabled richer explanations of how the outcomes occur and when they occur (Markus and Robey, 1988). Thus, by using the hybrid we can make predictions of the individual stages whereas providing an explanation of the intervening processes or intervening variables.

3.4. Triangulation of Perspectives

Another consideration in developing the theoretical framework was the nature of the focal actor. According to Markus and Robey (1988), the third dimension of the causal structure of theoretical models is the level of analysis. Clearly explicating the level(s) of analysis is essential for avoiding problems of inference (Yang & KURNIA, 2009). Problems of inference are said to arise when concepts are defined and data collected at levels of analysis inappropriate for the theoretical propositions being examined (Markus and Robey, 1988 p. 593). The traditional technology acceptance literature takes the end-user as a technology user and evaluates the individual's adoption based on the utilitarian attributes of technology in social context. Although a lot of the IS literature on technology acceptance stems from Davis (1989) seminal work on the technology acceptance model, this has been extended significantly to include social influence, some specific contextual factors and personality factors (K. K. Kim, Shin, & Kim, 2011; Luarn & Lin, 2005; Taylor & Todd, 1995). However, many of the extensions of the original TAM to the mobile data services stream do not consider the possible changes to the unit of analysis (the end user). The adaptation of the organizational setting theory to a consumer decision-making context requires specific contextual and identity relevant predictors and mechanisms that will enrich the understanding of the phenomenon and meaningfully extend the theory (Alvesson & Kärreman, 2007). Johns (2006) notes that new contexts (from organizational setting to consumer setting) can lead to new causal structures that can affect the existing theory fundamentally. By fundamental, he stressed that new context can render existing relationships between concepts non- significant and alter the magnitude of certain relationships.

To this end, we propose that the extension of technology acceptance and adoption theories to the mobile data services (where the end-user is also a consumer) stream should consider the new identity of the focal actor as a consumer and triangulate a number of perspectives of the end-user on the phenomenon of mobile data services adoption. As posited by (Pedersen, Methlie, & Thorbjornsen, 2002) the adoption decision of the individual end-user would be better understood

in predicting and explaining mobile data services use and adoption if all the different contextual perspectives of the end-user are considered. In addition, the integration of multiple streams of work into a framework to shed light on a phenomenon of interest is considered extremely valuable from a scientific point of view (Venkatesh 2012). As the analysis of the individual moves from the organizational perspective to a consumer in a voluntary capacity, making decisions within a social context IS models will benefit from insights from the consumer science stream of research. Hong & Tam (2006) found that the determinants of consumer adoption are different from employee adoption. Consequently, users do apply different decision-making processes depending on the context i.e. the characteristics and usage contexts of the technological artifact (Orlikowski & Iacono, 2000). Hence, the mobile data services end-user can be evaluated from three different contextual perspectives: 1. The end-user as a technology user; 2. The end-user as a consumer and 3. The end-user as a social network member (Pedersen et al. 2002) Thus, the perspectives of the end-user in adoption and technology acceptance, consumer science and sociology need to be considered in providing a better evaluation of his/her likelihood of adopting mobile data services.

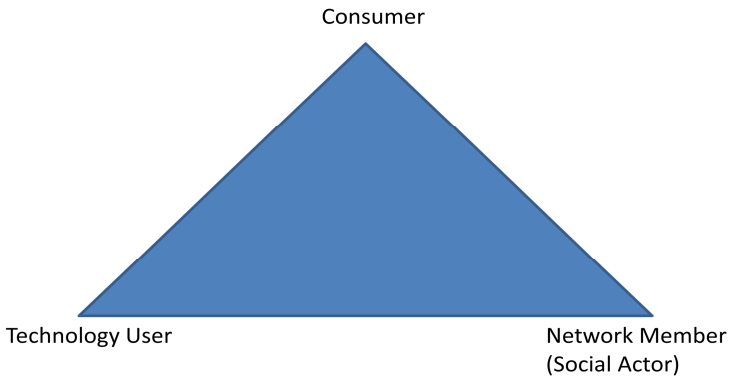


Figure 3.2 The end-user perspectives; adapted from Pedersen et al. (2002).

In the process approach perspective, Roger's DoI is relevant for explaining the technology acceptance aspect of the consumer's acceptance, use and adoption. Whereas, from a social actor perspective, the domestication approach, could be applied as a consumer, there is a need to ascertain certain contextual constructs from the consumer decision making process to explain the end-users acceptance, adoption and use of mobile data services. Furthermore, mobile data services are a value added service. Consumers will usually have an existing relationship with the service

provider; the quality of this relationship can affect his/her decision to accept any additional services.

3.5. The Integrated Model of Mobile Data Services

Based on the extant IS literature and the analysis presented below, a theoretical framework to guide the study of the adoption decision process of a mobile data services consumer is now offered. The theoretical framework is rooted in existing theories about technology acceptance, use, and consumer behavior. Thus, reflecting the suggestions made by several researchers (e.g. Hong and Tam, 2006; Pedersen et al. 2002) that consumers utilize multiple modes of decision making, this paper hypothesis a framework which draws upon an array of theoretical perspectives on consumer decision making (i.e. Innovation decision making, consumer decision making and domestication approach) to build an integrated mobile data services adoption model.

Instead of viewing technology acceptance as synonymous to adoption, this thesis is of the opinion that technology acceptance, use and adoption are separate but related concepts that work together in explaining the adoption process. Consequently, we propose that the phenomenon of mobile data services adoption by a consumer is a process that begins with technology acceptance through an initial use, an evaluation and then continual usage that lead to the consumer having the services becoming rooted in his/her everyday life - adoption as illustrated in figure 3.3.

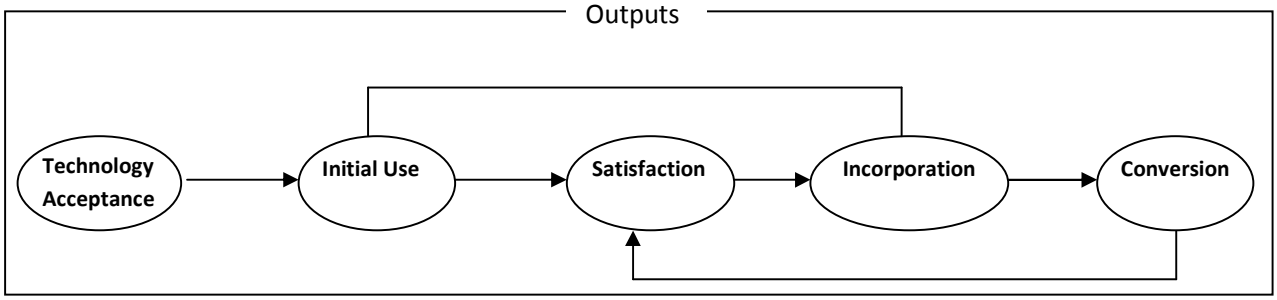


Figure 3.3 Integrated Model of Mobile Data Services

As a process, the proposed model has the consumer's behavioral intentions (a product of technology acceptance) as an input and initial use and incorporation (continual use) as outputs at different stages of the process. Both in practice and consumer science research, a consumer's evaluation of performance of a technology's initial use determines its continued usage (Oliver &

Westbrook, 1993). The initial usage could be in the form of experimentation, trial or exploration (e.g. Sarker and Wells, 2003) recursively triggering evaluation leading to an affective construct called satisfaction (Bhattacherjee, 2001). The satisfaction, continual usage and the conversion aspect of the adoption process of the proposed model are part of a continuous process throughout the consumer's consumption lifetime. Another significant challenge in the extant literature is a researcher's quest to explain a technology adoption phenomenon using a set of dependent and independent variables (variance approach) instead of seeking to explain how the adoption outcome occurs through a sequence of events (Mohr, 1982). Thus, the theoretical objective of this research is to identify the various determinants at each stage of the process. The following sections describe the theories and frameworks that form the basis for the various stages of the proposed theoretical framework. Determinants of the technology acceptance literature, DoI, domestication and the IT Continuance Model are included in the theoretical framework.

3.6. Technology Acceptance

This section reviews the key technology acceptance models engaged in explaining and predicting the adoption of mobile data services. Further, it examines the set of empirically tested determinants of mobile data services acceptance. The technology acceptance model (Davis, 1989) grounded in the theory of reasoned action (Ajzen 1978) is the most used technology acceptance theory in the extant literature. Its causal relationships between beliefs, attitudes, behavioral intentions and actual behavior have been the key pillars of the technology acceptance literature. The idea is that an individual's beliefs about a technology form an attitude, which influences behavioral intention that in turn influences behavior (Ajzen 1991). However, a longitudinal study by Davis (1989) which was later confirmed by Todd & Taylor (1995) and Venkatesh et al. (2003) led to the omission of the attitude construct from later studies, especially the mobile data service literature. Figure 3.4 depicts the categorization of the determinants of technology acceptance found in the literature. In broad terms, existing literature posits that technology characteristics, end-user characteristics and subjective norm (i.e. Social environment) influences technology acceptance.

Technology Characteristics

The literature on technology acceptance has long recognized that the attributes of a technology can influence its acceptance (Rogers, 2003). Every technology has its unique attributes. The technology brings with it its own situational or contextual factors, and the fate of the technology acceptance literature lies in how its general theories (e.g. TAM, DoI, and UTAUT) are applied to specific contexts to identify relevant determinants and predictors that meaningfully extend the theories (Johns 2006). Also, there have been calls for the need to expand the space of theoretical mechanisms in technology acceptance (Bagozzi 2007; Venkatesh et al. 2007). Unfortunately, this has been a crucial problem in the application of technology acceptance theories to new situations like mobile data services. For example, the technology acceptance literature is full of situations where organizationally based individual end-user beliefs are used to explain the behavioral intentions of the end-user as a consumer. Thus, researchers have applied findings from research conducted in an organizational perspective in an unrelated consumer environment without acknowledging that the original findings may be context-specific.

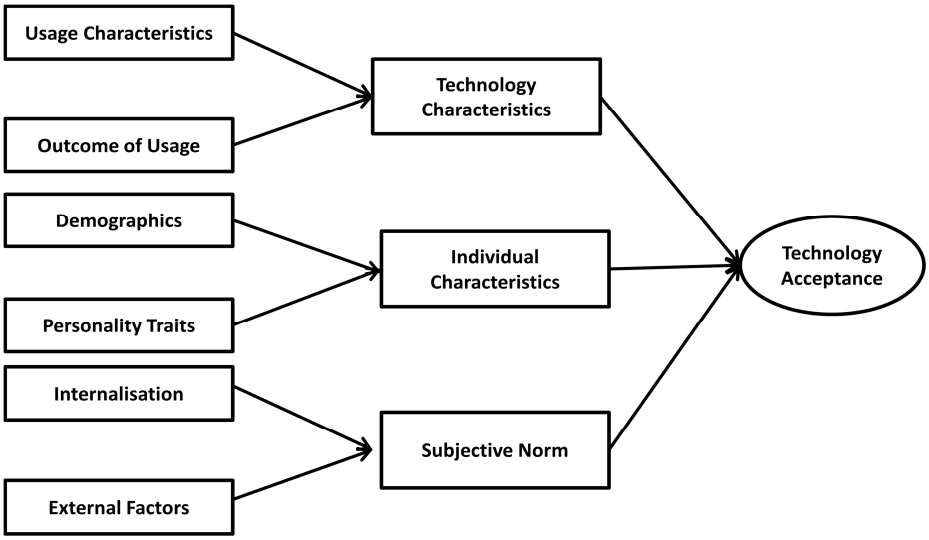


Figure 3.4 Categorization of technology acceptance determinants

Most of the technology characteristics studied in literature originated from the TAM (Davis 1989) Diffusion of Innovation (Rogers 2003), theory of planned behavior (Ajzen, 1991) and the unified theory of acceptance and use of technology (Venkatesh 2003). The original TAM grounded on TRA gauged the influence of four internal variables upon the actual usage of the technology. It

identified perceived ease of use (PEoU), perceived usefulness (PU), attitude and behavioral intentions as the internal variables with PU and PEoU as significant predictors of attitude and behavioral intention. As stated earlier, Venkatesh & Davis, (2000) later proposed a revised TAM, which omitted attitude as a determinant of behavioral intentions. Perceived Usefulness, which is heralded as the key determinant of technology acceptance, is defined as the extent to which the technology is expected to improve a potential adopter's performance. In addition, the PEoU construct was defined as "the degree to which a person believes that using a system would be free of physical and mental effort" (Davis, 1989; Davis & Venkatesh, 1996). TAM constructs have been extensively applied to the user acceptance research of various types of technologies including e-mail, word processor, World Wide Web, enterprise resource planning (ERP) systems, and e-commerce (Davis, 1989; Lu et al., 2009). The TAM has been criticized for being too simplistic, deterministic and without sound theory or method for determining its key constructs (Bagozzi 2007). Further, the model is criticized for being tautological: if people expect the system to be useful, they will use it (Bouwman, Carlsson, Molina-Castillo, & Walden, 2007). Another criticism of TAM, which it inherited from TRA, was its assumption that end user's behavior is under his/her volitional control. To overcome this shortcoming, the theory of planned behavior added a third factor - perceived behavioral control - that affects behavioral intentions and actual behavior (Ajzen, 1991).

Another popular theory used to explain and predict technology acceptance is diffusion of innovation theory (DoI) as propagated by Rogers (1995). Like TAM, DoI posits that the individual's acceptance of an innovation can be explained and predicted by certain characteristics of the innovation. Rogers (1995) identified five attributes of an innovation that have key influences on innovation acceptance and diffusion. The factors, Relative Advantage, Compatibility, Complexity, Trial ability and Observability have been widely used in technology acceptance literature (Duan, He, Feng, Li, & Fu, 2010). Of these constructs, relative advantage, complexity, and compatibility have provided the most consistent explanation for the adoption of mobile adoption research (Mallat, 2007). Relative advantage is defined as, the degree to which an innovation is perceived to be superior to current offerings. Complexity defined as the degree to, which an innovation is perceived as difficult to understand and use. While compatibility is defined as the degree to which

an innovation is perceived as being consistent with existing values, needs, and experiences of potential adopters (Rogers 2003).

Over the years, other determinants based on the characteristics of the mobile data technology have been discovered and empirically validated. Notably among them are; price (Lichtenstein, Ridgway, & Netemeyer, 1993) perceived cost, facilitating conditions, network effect (Mallat 2007), perceived trust (Barnes & Huff, 2003), perceived value (Sweeney & Soutar, 2001) perceived risk, perceived security (L. Chen, 2008), perceived enjoyment, playfulness, emotional values (C. Carlsson, Carlsson, Hyvonen, Puhakainen, & Walden, 2006) and perceived credibility. These determinants of technology acceptance can be sub grouped into usage characteristics (e.g. Perceived ease of use, perceived complexity, perceived cost, perceived trial ability, perceived compatibility) and outcome-of-usage characteristics (perceived usefulness, perceived relative advantage, perceived enjoyment, perceived trust, perceived value, perceived image and the network effect). The validation of these constructs has increased understanding and predictability of the mobile data services technology acceptance. However, remarkably little research has gone into how these factors influence the individual's decision at the various stages of the technology adoption process.

Individual characteristics

"Why have some individuals readily adopted new information technologies whilst others reject them?" (Agarwal and Prasad 1998). The stream of research on technology acceptance has documented results indicating that individual characteristics are often significantly associated with their motivations of technology acceptance. The characteristics of the individual used in technology acceptance literature can be differentiated between demographics and psychographics. Some studies also include contextual factors as part of the individual difference variables (Alavi & Joachimsthaler, 1992).

Demographic Variables

Demographic profiling is the process of splitting the market by considering personal similarities and differences, such as gender, age, marital status, occupation, income, and household structure. The relationship between socioeconomic characteristics and consumer behavioral intentions has been

widely researched in technology acceptance literature (Im, Bayus, & Mason, 2003; Meuter, Bitner, Ostrom, & Brown, 2005). For example, Wei (2001) studied the socioeconomic characteristics of mobile phone laggards in Hong Kong. (Pedersen, 2005) studied the demographic characteristics of early adopters of mobile commerce when compared to non- adopters while Turel, Serenko, & Bontis (2007)did the same for general mobile services like voice and messaging.

The level of education of an individual is found to be directly related to their level of resources, and hence their ability to experiment and adopt new technological innovations (S. C. Chia, Li, Detenber, & Lee, 2006; Van den Bulte, 2000). However, the effect of income and age on innovativeness has enjoyed mixed results from innovation diffusion studies. Whereas Im et al (2003) and Steenkamp, Hofstede, & Wedel (1999) found no significant effect of income, age and education, Tellis, Prabhu, & Chandy (2009) and Rogers (1995)reported a positive correlation. Tellis et al. (2009) in a cross-country study of consumer innovativeness posits that the five demographic variables of age, income, mobility, education and gender are key predictors of consumer innovativeness. Furthermore, studies by Ha & Stoel (2004), Rogers (1995) and (Goldsmith, Freiden, & Eastman, 1995) collectively show that innovative consumers are in general better educated, and younger than the general population, have higher incomes and occupational status, and are more often females than males. Meanwhile, Tellis et al. (2009), (Goldsmith & Foxall, 2003) and Steenkamp et al. (1999) reported a negative correlation between age and consumer innovativeness.

Although the demographics are easy to measure and most studies collect demographic data as a matter of course, its predictive validity remains highly debated. Further, in spite of this attention, their effect on technology adoption as shown above is found to be less significant or often conflicting. Given that the changed social and the economic world, women, older consumers, the less educated, and the less affluent all have access to and some level of familiarity with using basic technologies like mobile applications. Therefore, demographic factors are not of critical interest in understanding why consumers use mobile data services (Dabholkar & Bagozzi, 2002).

Psychographic Characteristics

The role of individual psychographics as determinants of various user behaviors is well established in information systems, social psychology and consumer behavior research (Davis, 1993; Yi, Fiedler,

& Park, 2006). While there are varied personality traits reported in the information systems literature, innovativeness is identified to have the most consistent significant results, in determining the individuals' behavioral intentions towards mobile data services (Karaiskos, Kourouthanassis, Lantzouni, Giaglis, & Georgiadis, 2009; Kourouthanassis, Georgiadis, Zamani, & Giaglis, 2010).

Innovativeness influences the speed at which the adoption of a product takes place after it has entered the market. Innovation diffusion research on consumer innovativeness has studied innovativeness on three different dimensions: Innovative Behavior (IB), which deals with a realized (actualized) innovativeness, Personality Traits Innovativeness (PTI) also referred to as innate innovativeness and Domain-Specific Innovativeness (DSI). Personal innovativeness is defined as, the innate willingness of an individual to try out and embrace new technologies and the related services (Agarwal and Prasad 1998, p.208). Personal innovativeness influences new-product acceptance positively (Im, Bayus, & Mason, 2003). Based on the innovation diffusion theory, personal innovativeness leads to the separation of potential adopters into what characterizes as innovators, early adopters, early and late majority adopters and laggards (Rogers 2003).

Agarwal and Prasad (1998) applied the DSI to information technology in the study of the innovativeness of Internet users and proposed a new construct “Personal Innovativeness in Information Technology" (PIIT) and illustrated its moderating effect on the antecedents of individual perceptions about a new information technology. PIIT was conceptualized as the willingness of an individual to try out any new information technology. This has since been applied extensively in mobile data services adoption studies. PIIT have since been found to be significant in influencing behavioral intention both directly (J. Lu, Liu, Yu, & Wang, 2008; Yang, Lu, Gupta, Cao, & Zhang, 2011) and indirectly through perceived usefulness and perceived ease of use (Jackson, Yi, & Park, 2010)

Subjective Norm

In both TRA and TPB models, subjective norm directly determines behavioral intention (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). Fishbein and Ajzen, (1975) posit that normative beliefs constitute the basis for subjective norm and defined it as “the subjective probability that a given

referent individual or group will approve or disapprove of performing the behavior under investigation". However, the extent of its influence depends on a person's motivation to comply with the referent individual or group. Subjective norm on technology acceptance has been widely acknowledged in the information systems literature (M. C. Lee, 2009). Following the social psychology tradition, previous studies in technology acceptance (Thompson, Brown, Kay, & Titterington, 1991) have used subjective norm, social influence, social norm and social factor with similar items but with mixed results (Y. Lee, Kozar, & Larsen, 2003).

Although, TAM rejected the influence of SN on behavioral intention of its early application, recent studies have resulted in a significant and positive correlation between the social influence construct and intention (Davis, 1989; Hong, Thong, Moon, & Tam, 2008; Kulviwat et al., 2007; Teo & Pok, 2003). The mandatory organizational settings used in Davis, (1989), and in Mathieson (1991) studies have been identified as one of the reasons for the insignificant influence of SN on intention (Lu, et al. 2005 p. 260). An individual consumer adoption behavior is often considered as voluntary and will be affected by the social pressure from his or her social network. Further, subjective norm influences acceptance not only directly, but also via its direct positive effect on perceived usefulness (Lu et al. 2005).

Literature explains that subjective norm can be further divided into two parts: external and Interpersonal. The external includes mass media reports and expert opinions while interpersonal involves the influence of friends, peers, and family members (Bhattacherjee, 2001). They found that interpersonal influence had a strong effect on e-service continuance intention. Moreover, another study found that adopters of an innovation who did not continue to use the product relied less on external influence and more on interpersonal influence than those who continued to use the product (Parthasarathy & Bhattacherjee, 1998).

3.7. Innovation of Diffusion Adoption Process

Rogers' (2003) five- stage innovation decision process as the dominant adoption process model has a broad empirical basis that evidences impressive universality in the extant literature (Dearing, 2009; Jung, Chan-Olmsted, Park, & Kim, 2012). The model proposes that an individual innovation decision process passes through, the first knowledge of the innovation, through persuasion to

decide to either adopt or reject, to the implementation of the idea and finally the confirmation of the decision. Therefore, the innovation-decision process illustrates how individuals seek and process information in order to decrease uncertainty about the innovation (D. Beck & Black, 2012). A number of assumptions underlie the innovation decision model. First, individual innovation decision making is a process which follows sequential steps influenced by changes in knowledge and behavior. Second, technologies are discrete packages developed by independent and neutral innovators (Roger 1995). Thirdly, diffusion rate is a function of push and pull forces where push factors include features of the technology and channels of communication and pull determined by adopter's rational choice. Fourth, adoption decisions are dependent on available information, preference functions and adopter's properties; and finally time scales are relatively short and the diffusion history is not essential.

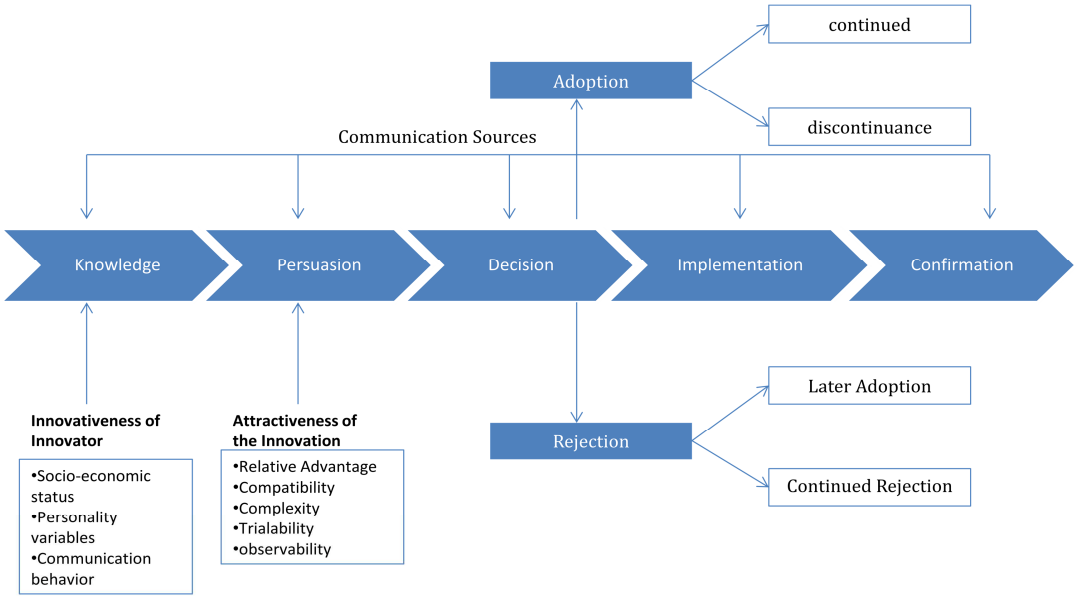


Figure 3.5 Rogers' Innovation Decision Process Model

The first stage, knowledge, is where an individual is exposed to the existence of the innovation (e.g. Mobile payment system) and gain some understanding of how it functions. Awareness and knowledge of a new mobile data service can occur through an individual's interpersonal communication, mass media, and a direct contact with the provider or the individual's exploration of the various functions of a new mobile device (e.g. Smartphone). The individual's prior conditions (including needs/problems, personal innovativeness, social systems) and communication channels will influence how knowledge is acquired and applied.

The second stage, persuasion, occurs when the individual forms a favorable or unfavorable attitude towards the innovation. While the knowledge formation stage is cognitive, the mental activity in this stage is affective. Once the individual knows about a new idea in the knowledge stage, he or she can begin to form opinions towards it in the persuasion stage. Persuasion is related to perceived risks and consequences of adopting and using the new product. Drawing parallels with existing technology acceptance models, the persuasion stage could be referred to as the attitude or intention stage of the TAM. Rogers (1995) posits that the individual's evaluation of innovation is based on the attributes of innovation and provided relative advantage, complexity, compatibility, trial ability and observability as the keys attributes used in the evaluation.

The decision stage takes place when an individual engages in the vicarious experience with the innovation (via direct trials or demonstration sessions held by change agents), with the result being a minimized level of uncertainty about the innovation that leads the individual to decide to adopt or reject the innovation. The acceptance or rejection of the new service based on the cognitive and the affective stage is built through the knowledge and persuasion stages. The decision to adopt or reject is not final since the user may decide to reverse it in the future.

The fourth stage is implementation; in this stage, the individual employs the innovation to a varying degree depending on the situation. If it is about mobile banking, the individual begins to use the mobile to transfer funds, make payments or check bank balances. The final stage is confirmation, when individuals seek reinforcement subsequent to their decision and initial use of innovation. The individual seeks information to reinforce their decision. If the information received is conflicting, they may reverse their decision.

3.8. Domestication

In a seminal work by Silverstone & Hirsch (1992), an attempt was made to provide an integrative frame for the analysis of household practices and relations and consumption and use of information and communication technologies. This framework becomes known as the domestication approach, and it is sometimes referred to as the domestication theory (Hynes & Richardson, 2009). It is aimed at providing insight into the surrounding social processes involved in adoption and consumption (R. Ling, 2002). Domestication could be described as a process of

technology consumption where the consumer and technology are actively involved in transforming each other through their interactions (Silverstone, 1994). Where active consumption could be referred to as where the "negotiations and re-negotiations in consumption" transforms both the consumer and the technology (Silverstone, 2006). Thus, the domestication approach provides a departure from the deterministic focus of technology acceptance and diffusion of innovation research by putting emphasis on technology as a social artifact thereby extending technology adoption to a stage where it is embedded in the society. It emphasizes the "social construction of technology" where the consumer is perceived to influence the nature, scope and functions of the technology (Ward, 2006).

The emergence of new technological innovations requires users to accept them as relevant and useful in their everyday life (Silverstone, 2005). Domestication, thus, focuses on the technology consumption in an individual's everyday life. When the domestication has been successful, the service is no longer regarded as a strange, frustrating and difficult consumer service but reliable and trustworthy.

More specifically, it provides an understanding of what technology means to an individual and what role it plays in their life (Haddon, 2003). As posited by Silverstone

> *"by domestication I mean something quite akin to the domestication of the wild animal... a process of taming or bringing under control. Technologies, television and television programmes must be domesticated if they are to find a space or place for themselves in the home" (Silverstone, 1994: 83).*

The extent of the process of taming depends on the history of the technology and on the expression of the subjectivity of those who are involved as explained by Hirsch (1992). For example domesticating mobile phones to an urban dweller that is used to telephony is not as complex a process as it is for a rural person who has no concept of telephony. Perhaps the subjectivity of the rural dweller demystifies the perceived transformation that is required for the domestication to take place (Silverstone, 1994 p.98). Although, initially, domestication is presented as the taming of the technology, it could also be perceived as taming the individuals and the households involved. The readjustments, negotiations and power plays that are invoked at the appearance of the

technology described by Silverstone (2006) could be referred to as the taming of the household by the technology (p. 234-235). Thus, domestication is used to find the crossover where technologies and people adjust to each other and find a way to co-exist (Hynes and Richardson, 2009). Therefore, the history of both the technology and individuals in a particular context should be considered to provide a better understanding of the individual's adoption process (Silverstone, 1994 p. 98). However, the significance of these biographies is apparent at the unusually early stage of the domestication process; the stage where meanings are constructed either through design from the developer's perspective (Silverstone & Hadden, 1996) or the histories of its consumers.

From its humble beginning of consumption of media in the household, use of domestication (Haddon 2006), domestication perspective has transcended the household into multiple spheres of social life (Haddon, 1998). For example, domestication research has studied differences in adoption and use of mobile services in work and leisure contexts, in different contexts represented by demographic variables such as age (young versus other users) and gender (female versus male users), in contexts of private and public use, and in the dynamic contexts represented by multiple and changing roles of modern technology users (Green, Harper, Murtagh, & Cooper, 2001; Harwood, 2011; Wellman, 2001). O'Hara et al. (2001) applied the domestication approach in the study of the adoption and mobile services by knowledge workers while Ward (2006) focused on the use of the Internet. The level of analysis has also extended from the household or "home" to the individual identity (Hartmann 2006).

3.8.1. Key Assumptions

Haddon (2001) identifies five key assumptions to the domestication perspective. First, domestication differentiates use from consumption; thus it is more about the individual's meanings and experiences placed on the use of the technology. These meanings of the technology are derived either from the marketing or wider media discussions or from what others have said about them. In order to provide a better understanding of adoption and use we need to appreciate the interactions and negotiations that lead to use. Thus, consumption considers the roles that technology assumes through these interactions and negotiations even after acquisition. Secondly, domestication adopts a process approach to adoption. Similar to the diffusion of innovation adoption process, domestication perceives adoption to begin with the individual imagining the role

of technology in their daily life and the negotiations around its acquisition. The perceptions about the technology could either lead to a purchase decision or a rejection decision. Once acquired, the process of identifying appropriate usage of technology in the individual's everyday life begins. Such incorporation could include considering its fitness in the individual's personal and societal norms and values. Thus, existing routines and structures need to be negotiated, for the new technology to fit in the individual's daily activities and other relations (R. S. Ling, 2004). This process may lead to only an initial use of the technology never to be used again. It may also lead to several re-negotiations of routines, creation of new routines and changes to its placement -both physically and temporally.

The third assumption discussed by Haddon was that domestication is not a one-off process. The dynamics of the society, home and the individual's own daily activities are not static, and their interactions may call for a reassessment of the role of technology in the individual's daily life. For example, the role of mobile money technology in the life of a migrant worker may change significantly when he or she manages to relocate the family to his or her present location. There are temporal changes to the importance and hence the role of a particular technology in the life of an individual. As consumption is influenced by the society and personal or household preferences and priorities, the role of the technology is reassessed. It is also noted that the taming of the technology is not always successful. This is a particular distinction from the variance approaches (e.g. TAM) used in the existing technology adoption stream of the information systems literature.

Fourthly, domestication views a three way interaction between the individual, the technology and other individuals. Although, the main focus is on the interaction between the end-user and technology, a considerable attention is given to that of others and the technology. The individual end-user's interaction can be viewed through the lens of the relationship between technology and other users. For example, the use of the mobile money technology may depend on the availability of agents who also act as a support team for the mobile network operator. The relationship between the end-users and the agents is found to be significant in understanding the end-user's adoption of the technology (Merritt, 2010). Discussing the differences between technological determinism, social deterministic, affordances and domestication; Ling (2004) identifies this attribute of the domestication approach is what makes it a better analytical tool than the rest.

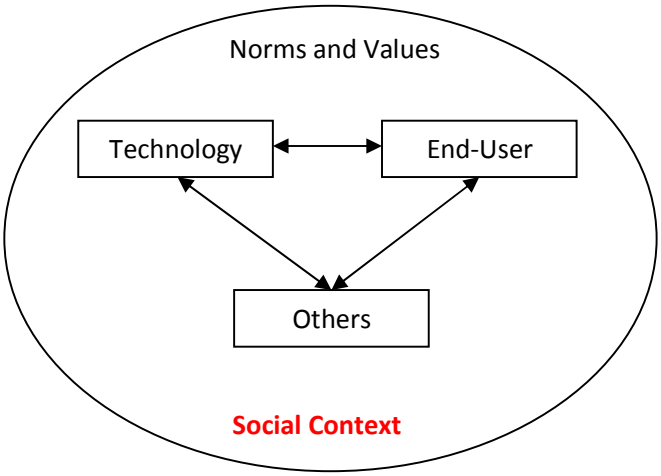


Figure 3.6: Technology and end-user interactions within a social context

Thus, in the domestication perspective, the use of technology is also observed through the lens of consumption by others. The influence of others in the adoption process described by domestication is well investigated in the literature (see Haddon, 2004 p. 57).

Finally, Haddon posits that domestication assumes that end- users are not passive users of technology. In addition, the roles and meanings placed on technology shapes lives and are in turn shaped by us. The experiences of the individual are not totally pre-determined by the technology. Individuals form new meanings to the technology over and above what it was initially intended for. Thus, domestication provides a blend between the old technology determinism and social deterministic principles.

3.8.2. Dimensions of Domestication

Figure 3.7: The Domestication Process

The domestication perspective originally describes four steps in the adoption process (Silverstone and Haddon, 1996; Silverstone et al. 1992). These include *appropriation, objectification, incorporation and conversion*. These stages include the initial knowledge and awareness that leads to the usefulness and other attributes of technology, to its purchase and its embedding in life. Finally, the process describes how the technology becomes externalized as part of the social profile (Ling, 2004 p. 28). Thus, domestication begins at the developer's workshop where certain public

meanings are being associated with the technology in the formal market economy and ends at the stage where the consumer articulates his or her expressiveness of the technology used (Ward, 2006 p.151). Later, the model was updated to include two additional moments (commodification and imagination) making it six. However, presented linearly in figure 3.5 above, Silverstone is careful to state that the stages of domestication, "can be considered neither discrete, nor necessarily as evenly present, in all acts of consumption (1994, pp. 123-4). In other words, the process is not necessarily entered sequentially, and it is possible for a person to mentally objectify a product before going ahead to purchase (Ling, 2004). Although, the six moments were introduced in Silverstone (1994), to date most literature only uses the four stages identified in his seminal work (see Hynes & Richardson, 2009; R. S. Ling, 2004; Vuojärvi, Isomäki, & Hynes, 2010). Taking the seminal work approach we will still like to explain a fifth moment, the commodification, because of its significance and emphasis especially expressed in his more recent work, Silverstone (2006).

3.8.2.1. Commodification

The transition or translation of meanings has an object move from the public sphere into the private sphere of the individual or household and vice versa is the heartbeat of the domestication approach. These moments are what is referred to as commodification. From the developer's workshop to the market place, an object or service is given functional, aesthetic and symbolic meanings. It is these meanings that define them as the products with specific attributes that expresse the values and ideals of its societies and lead to the beliefs that a consumer creates about the product (Silverstone, 1994). These meanings embodied in the products design and marketing, and also known as the formal economies are what defines what the product or service can and should be used for (Silverstone and Haddon, 1996). In the developer's workshop, there is the conception of the idealized consumer of the product. Quite often the developers and producers seem to view the inherent technological potential of an innovation as what determines uses. As the product goes through the trajectory of the domestication moments in consumption, the negotiations and adjustments in the private sphere create or translate new meanings, which are expressed in the public sphere of the developer's workshop and the marketing of the product. Hence in domestication, consumption is seen as cyclical with commodification as the axis (Silverstone, 2006). Thus, through the commodification stage, the domestication perspective

moves beyond the linear adoption models (e.g Roger's S curve) to see consumption as a cycle of transitions and translations of meaning from the formal economy to the moral economy and vice versa.

3.8.2.2. Appropriation

Appropriation is the moment when the product leaves the public sphere into the consumer's private sphere; from the formal economy to the private economy. This moment is bound with symbolic interpretations of the product or service. It is the moment when the consumer evaluates the attributes of the product or service and constructs it as either an object of desire or something they do not want (Hynes & Rommes, 2006). Quite similar to the attitude formulation stage of the social psychological theories, or the awareness stage of the diffusion of innovation adoption decision process. Whereas certain authors have noted that the studying of the appropriation moment is redundant for non- domestic situations (see Hynes and Rommes, 2006 pp.128) we think that it is particularly crucial when it comes to the study of the individual consumer. It is at the appropriation moment that the consumer becomes aware of the product or service, either through marketing, friends or family that the product could somehow fit into his or her life.

3.8.2.3. Objectification

This can be referred to as the physical disposition of objects in the spatial environment of home. At this moment, the object of domestication finds a space in the moral economy. The presence of a new object in the private sphere calls for negotiations for physical space. Silverstone et al. argues that the eventual positioning of the object in the private sphere objectifies our values and sense of aesthetic towards the object (Bakardjieva, 2005). This is seen in the positioning of television in the homes (Silverstone, 2004). In domesticating a service, the role of the objectification moment becomes quite redundant. However, it could be argued that the objectification of a service should be seen from the space given to the object that carries the service. For example, in the objectification of the internet, an attention could be given to the physical location given to the computer as in Ward (2006 pp.137). Further, Silverstone (1994) posited that objectification is not confined to material objects and that services can be objectified in the talk of the household and news events that provides the basis for identification (pp. 129).

3.8.2.4. Incorporation

Incorporation is the actual use moment of the domestication approach. The fundamental reason for appropriating a technology is functional (Ling, 2004). Whilst objectification brings the object or service to gain a particular identity and physical presence in the home, incorporation describes the functions of the object over and above what is described in its literature (Silverstone et al. 1996 pp.21). It describes how the object finds a place into the routines of daily life. Thus, integration of an object or service into the temporal structures and rituals of everyday life is the beginning of the incorporation moment. In use, incorporation provides us with the ability to bring to practice both the designer's meaning and our own symbolic meanings that are over and above what the product is designed to do. An analysis of consumers' use of technology through the incorporation moment of domestication could provide insight into the determinants of the technology appropriation in the first place. It can also be used to predict the appropriation of future technologies with similar symbolic meanings. It is this moment that most of the negotiations and adjustments take place as the consumer integrates technology into the daily life.

3.8.2.5. Conversion

Conversion like the appropriation moment deals with a transition between the private and public spheres. Whereas appropriation moment transits the object from the public sphere (formal economy) to the private sphere (moral economy); the conversion moment does the vice versa. This is a boundary across which the artifacts and meanings pass as the individual and the household express their usage of the product in recognition of a status to the outside world (Silverstone, 2004). We recognize conversion as an output of consumption that serves as an input to the process for further consumption. This is where the consumer's meanings are expressed and through commodification becomes part of the public meaning of the future appropriations and versions of the product. In a later work, Silverstone (2006) sees commodification as a better framing of the appropriation and the conversion moments (pp. 233). According to Silverstone, consumption is expressive. The household and its individuals will display the knowledge gained, competencies and frustrations at this moment of the domestication process.

3.8.3. The Moral Economy

The notion of moral economy is central to the domestication approach (Hartmann, 2006). Domestication approach holds that the household has its own values and practices that can be differentiated from that of the public, and that these values determine their usage of technology.

> The moral economy of the household is therefore both an economy of meanings and a meaningful economy; and in both of its two dimensions it stands in a potentially or actually transformative relationship to the public objective economy of the exchange of goods and meanings.
>
> Silverstone et al. 1992, p. 18

Drifting from the initial perceptions of moral economy has an issue of morality, a recent explanation by Silverstone (2006 p. 238) described it as a sociological notion of values and practices established on the ontological differences between constitutive forms of socioeconomic order and behavior. Hence, the moral economy of the individual is perceived in the daily practices of the individual as an economic entity with its own values and rituals. The individual consumer is a transactional system representing an economic, social and cultural unit. His or her cognition, evaluation and aesthetics are based on norms and values built through history, biographies and social environment. When an artifact is appropriated it moves from the public economy to the individual's moral economy. The individual in his or her moral economy may have meanings to the artifact which are different from that of the public economy. The adoption leads to negotiations in the individual's moral economy which shapes the daily practices. Similar to Pierson (2005) concept of the moral economy of the small business owner, the individual private context (personal traits, private interests, social contacts, status, habits) permeates their daily practices and shapes their consumption of technology. Thus, transposing the individual to the household, the notion implies that the individual as an economic entity influences the public economy through their contributions towards the production and consumption of the artifact.

3.9. Consumer Decision Making Process

In a mobile data services environment, most end-users are consumers, i.e. they acquire services from a MNO or a service provider, and that any insight from studies on how a consumer makes a

decision to purchase will strengthen understanding of mobile data services acceptance, use and adoption. The extant literature on consumer behavior has examined extensively the purchasing decisions of the consumer from their choice of mobile phones (Karjaluoto et al., 2005) to internet shopping (Smith & Brynjolfsson, 2001). In order to structure theory and research, consumer decision-making models are widely used in consumer behavior research (Erasmus, Boshoff, & Rousseau, 2010). Consumer decision-making has long been of interest to researchers leading to a number of models that try to explain the stages that a consumer goes through when making a buying behavior. Notable among these models are the Howard-Shesh Model (Howard & Sheth, 1969) of buying behavior, the Nicosia model (Nicosia, 1966), and the Engel-Blackwell-Miniard (EBM) model (Engel, Kollat, & Blackwell, 1968).

In Erasmus et al. (2010), consumer decision-making is defined as "the behavior patterns of consumers, that precede, determine and follow on the decision process for the acquisition of need satisfying products, ideas or services" (p. 82). The majority of the scientists in this area are interested in finding why individuals as consumers buy some goods and services and adopt a particular consumption behavior (Duhaime et al. 1996). Fundamental to all the classical consumer decision making models is a five-stage process i.e. The cognitive decision sequence of problem recognition, information search (internal and external), evaluation of alternatives, purchasing decision and post purchasing decision. The most popular contemporary consumer behavior model is the Engel-Blackwell-Miniard Model (Erasmus et al., 2010 p. 83). The constant improvements that this model is subject to over the last four decades, should have improved its explanatory powers in light of advances in consumer behavior theory and knowledge (Engel, J.F, Blackwell, R.D, & Miniard, P.W, 2001).

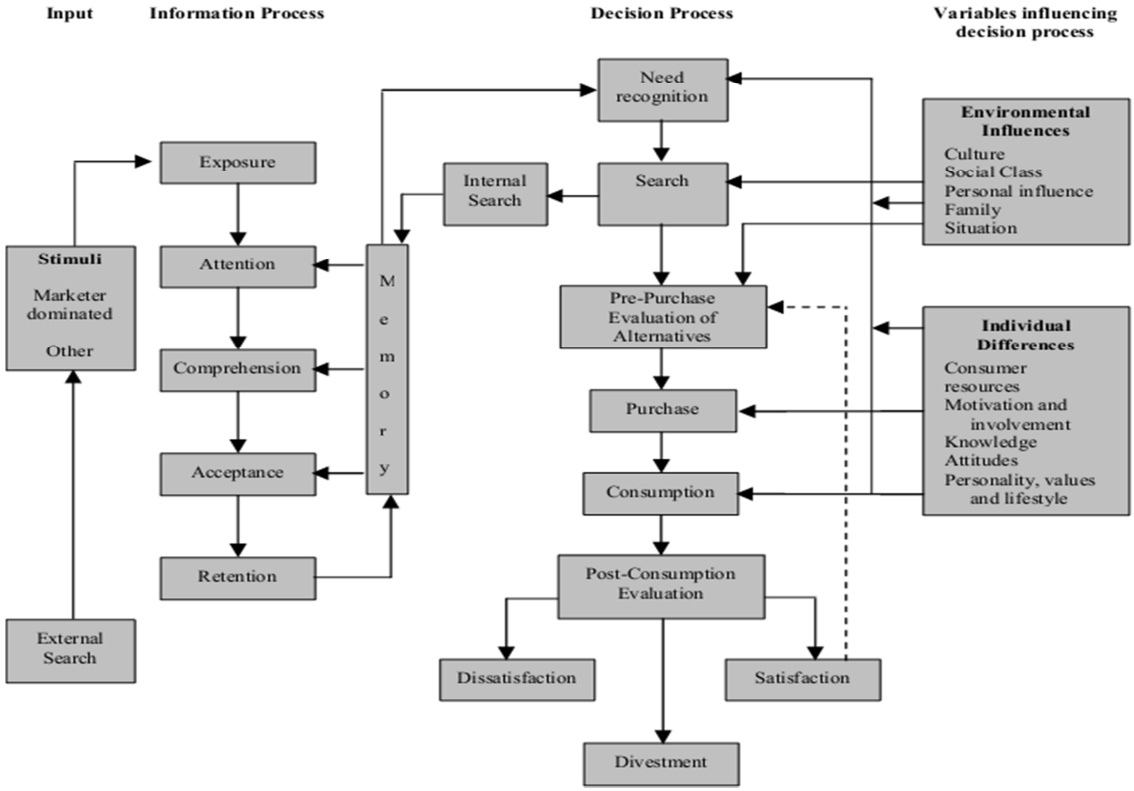


Figure 3.8 Consumer Decision Making Model

The core of the model is the seven-point decision process: need recognition followed by internal and external information search, alternative evaluation, purchase, consumption, post-consumption evaluation and finally divestment. Previous studies of marketing applying this general model have pointed out that for consumer decision making in the purchase of services, the post-consumption evaluation (satisfaction) is the most crucial step for continuous purchase because consumers cannot actually evaluate services pre-consumption because of their intangibility (Howcroft, Hewer, & Hamilton, 2003; McKechnie, 1992). Mckechnie (1992) goes on to stress, "Services are high in experiential qualities, which refer to attributes that can only be assessed after purchase or during consumption" (p.5). Thus, to determine the consumer's usage of mobile data services, an evaluation of the trial or initial use will precede any further usage or adoption. Although a consumer may not be entirely rational-active to go through all the seven steps provided in the consumer decision making model, he/she will still evaluate after initial use either consciously or subconsciously (Beckett, Hewer, & Howcroft, 2000).

This post-purchase, initial use evaluation, leads to the individual's satisfaction or dissatisfaction feelings. Thus, consumer satisfaction is defined in marketing literature as "the consumer's response to the evaluation of the perceived discrepancy between prior expectations (or some other norm of performance) and the actual performance of the product as perceived after its consumption" (Tse & Wilton, 1988 p. 204). Similarly, the expectation-confirmation theory (ECT) in the consumer behavior literature also posits that satisfaction with a product or service is a primary motivation for its continuance (Oliver, 1980) and defined satisfaction as "an ex-post evaluation of consumers' initial (trial) experience with the service, and is captured as a positive feeling" (Bhattacherjee, 2001).

The ECT proposes that before an initial use of a product, or service a consumer forms an initial expectation about the service (based on similar factors that determine behavioral intentions in social cognitive theories). After, they consume the service after which they evaluate the extent to which their actual consumption experience matched their initial expectations. The match is termed disconfirmation, and it combines with the initial expectation to determine satisfaction. Adapting the ECT to the specific case of IT services, Bhattacherjee (2001) developed the IT Continuance Model. Moreover, posited that, a consumer's perceived usefulness and disconfirmation constructs determine satisfaction.

Although the consumer-decision making models have had significant influence in structuring theories and providing research directions on consumer decision-making behavior, they have been criticized on a number of grounds including the assumption of "rational consumer decision-making behavior". It has been observed that whereas the models suggest that consumers engage in a sequential activities in deciding the purchase of products and services, actual consumer decision-making appears to be haphazard (Erasmus et al., 2010 p. 84)

4. Research Methodology, Approach and Design

4.1. Philosophy of Science

A good part of the answer to the question "why philosophy?" is that the alternative to philosophy is not ***no*** *philosophy, but* ***bad*** *philosophy. The "unphilosophical" person has an unconscious philosophy, which they apply in their practice - whether of science or politics or daily life.* (Collier, 1994)

4.1.1. Research Paradigms

Stating the philosophy of science of the current research ensures the soundness of the research and makes its outcome convincing by pointing out the theoretical assumptions underpinning the study and determines the status of its findings (Crotty, 1998). In conducting research, many paradigms describe the researcher's assumptions, beliefs and ways of interpreting data. Philosophically, researchers make claims about what is knowledge, how we know it, what values go into it, how we write about it, and processes for studying it (Creswell, 2007)These assumptions about how I learn what I learnt in this research naturally have bearing upon the type of understanding and interpretations that I derived from the study (Kuhn, 1996). They will also affect the level of generalizability and the quality criteria upon which the work can be judged. It is, therefore, necessary for me to explicate my paradigmatic stance for proper evaluation of theory construction (Walsham, 1995).

A paradigm is viewed as a group of basic beliefs and dictates which, for scientists in a particular discipline influence what should be studied, how research should be done and how results should be interpreted (Bryman, 2004). It represents the relationship between the world and its components and an individual "worldview". The beliefs are fundamental and cannot be proven; they can only be accepted by faith (Guba & Lincoln, 1994). Since its introduction by Kuhn in his publication of "The Structure of Scientific Revolutions" in 1962, competing paradigms of inquiry have emerged and been debated in the extant literature. Guba and Lincoln (1994) identified four different paradigms; positivism, post-positivism, critical theory and constructivism. However, for the purpose of the current research I limit the discussion to post-positivism versus constructivism, in respect to a researcher's ontology, epistemology, and axiology. The debate on the differences between these two paradigms, which is referred to as the "paradigm war" by Tashakkori & Teddlie

(1998) is usually linked to the choice of research design. For example, a quantitative approach implies the holding of positivist paradigm beliefs, whereas a qualitative approach implies the holding of beliefs associated with a constructivist paradigm position. Apart from these two paradigms been central to the current study, it is also the most used paradigms in Information systems research (W. Chen & Hirschheim, 2004). Although, post-positivism has been a dominant paradigmatic stance in information systems research (S. A. Carlsson, 2005), constructivist research has been gaining acceptance within the discipline (Walsham, 2006). According to Burrell & Morgan (1979), the philosophical differences between these two paradigms are incommensurable – both ontologically and epistemologically.

4.1.2. Epistemology

Epistemology deals with "the nature of knowledge", its possibility, scope and general biases (Hamlyn 1995). It embodies a certain understanding of what is entailed in knowing, that is, how we know what we know. (Maynard, 1994) posited, "Epistemology is concerned with providing a philosophical grounding for deciding what kinds of knowledge are possible" and stressed the importance of identifying, explaining and justifying the epistemological stance we have adopted for a particular study. The epistemological question is, how is the research positioned (whether the relationship between the researcher and the researched is objective or subjective) relative to the phenomenon of interest and what can be known about it? (R. Chia, 2002) describes epistemology as "how and what it is possible to know" and the need to reflect on methods and standards through which reliable and verifiable knowledge is produced. Hatch & Cunliffe (2006) summarize epistemology as "knowing how you can know". They expanded this by asking how knowledge is generated. What criteria discriminate superior knowledge from imperfect knowledge, and how should reality be represented or described?

The positivist thinking emerging from the natural sciences is characterized by the testing of hypotheses developed from existing theories (deductive or theory testing) through the measurement of social reality. Thus, the positivist assumes a scientific approach to the development of knowledge and that only scientific knowledge is valid certain and accurate (Crotty, 1998 p.29). The early Positivist sees the researcher and the researched as truly independent; that is they do not influence each other (Lincoln & Guba, 2000). This is referred to as dualist or objectivist

perspective. Strategies are followed to eliminate or minimize any influence in either direction. Although the post-positivist view abandons the dualist view, it maintains objectivist position through "guardians of objectivity" such as critical traditions (Guba and Lincoln, 1994). Knowledge aims to be either verified or not falsified objectively so it can be established as probable facts or laws (Tadajewski, 2006). It is accumulated through accretion of generalizations, which are tried against criteria such as significance, falsifiability, logical consistency, relative explanatory power, survival, internal and external validity, reliability, and objectivity.

The basic assumptions guiding the constructivist/interpretivist thinking is that people who are active in the research process socially construct knowledge and that researchers should attempt to understand the complex world of lived experience from the point of view of those who live it (Schwandt, 2000). This paradigm rejects the positivist view that the same method used for studying natural science can be used to study human behavior (Willis, 2007). The constructivist argues that their environment influences human behavior. Human makes sense of the world based on their historical and social perspective. They seek to understand the context and then make an interpretation of what they find which their own experiences and backgrounds shape.

4.1.3. Ontology

Ontology is concerned with the nature of reality (or being, or existence), and various ontological stances describe what can be real and what cannot. It seeks to answer the question of, what is in existence and what is real, what nature does reality takes, and, what is there that can be known about it? What is there in the world (Burrell & Morgan, 1979; Eriksson & Kovalainen, 2008; Guba & Lincoln, 1994)? This is about the assumptions that a researcher has about the way the world operates and the commitment held to particular views. In short, ontology describes our view (whether claims or assumptions) on the nature of reality, and specifically, is this an objective reality (objectivism) that actually exists, or only a subjective reality (subjectivism), created in our minds. Hatch & Cunliffe (2006) use both an everyday example, and a social science example to illustrate the point. For the everyday example, they use the example of a workplace report to assess whether it describes what is actually happening, or it is just the thought of the author.

The realist (positivists) ontology holds that one reality exists and that it is the researcher's job to discover that reality (naive realism) (Guba & Lincoln, 1994). The post-positivists agree that a reality

does exist, but argue that it can be known only imperfectly because of the researcher's human limitations (critical realism) (J. Maxwell, 2004). Therefore, researchers can discover "reality" within a certain realm of probability. They cannot "prove" a theory, but they can make a stronger case by eliminating alternative explanations. Thus, the post-positivist places strong emphasis on prediction and reproducibility of phenomena. Within the positivist ontology, an explanation of human behavior is thought to be reducible to materialist causes (Kuic & Simon, 1992). However, the ability of the post-positivist stance to capture the purposes and intentions of human behavior is considered problematic. Reducing the complexities of human actions to law-like causal relationships is deemed insufficient in explaining behavior in a specific social environment (Fay, 1996).

The ontological stance to scientific inquiry of the constructivist paradigm stresses the subject's interpretation of the event or the context of the investigation and questions the status of "concrete social reality" as described by the positivist. The constructivism paradigm, suggests that people construct their reality through experience, social and mental construction. This is also referred to as relativist ontology. Orlikowski & Baroudi (1991) defines relativism as research that assumes "that people create and associate their own subjective and intersubjective meaning as they interact with the world". Information systems research like most social sciences seek to understand the attitude, beliefs and values of people and their resultant actions in a given phenomena. Whereas positivism paradigm seems more appropriate for answering the "what" and "how" questions relating to these aspects of information systems research, the interpretivism paradigm tries to answer the "why" questions. Thus, understanding is the main role of interpretivist, and never a prediction (Pather & Remenyi, 2004).

4.1.4. Axiology

Axiology is a branch of philosophy that deals with how ethics, aesthetics and values should be treated in research (Lincoln & Guba, 2005). In essence, it covers the three key aspects of value; ethical values, aesthetical values and epistemic values. It explains the role that the researcher's own values play in all stages of the research process. Values can affect several aspects of a research: choice of the problem; choice of the paradigm to guide the problem; choice of the theoretical framework; choice of the principal data gathering and data-analytic methods; choice of

context; treatment of values already resident within the context; and choice of formats for presenting findings. Thus, values may be a crucial point of departure between positivist and constructivist form of research. Heron (1996) argues that our values are the guiding reason of all human action. He further argues that researchers demonstrate axiological skill by being able to articulate their values as a basis for making judgments about what research they are conducting and how they go about doing it. As the object of IS Research often involves socio-technical phenomena concerning social actors and their use of technology, our studies are not value neutral. Thus to a significant degree, IS research is subject to the broader ethical issues in social research (Berente, Gal, & Hansen, 2010).

Specifically, IS researchers are subject to the same guidelines for appropriate research that were defined in the Belmont Report from the National (USA) Commission for the Protection of Human Subjects of Biomedical and Behavioral Research (Biomedical & (US), 1979).

The Belmont Report outlines some key ethical principles and norms, which provides axiological basis for research:

- The principle of respect for persons: Treating participants with respect and courtesy - Individuals should have the right to decide for themselves whether to participate in research. You may not use information about people without first getting their informed consent. Special consideration should be provided for people with diminished autonomy.
- Beneficence: Two general rules have been formulated as complementary expressions of beneficent actions in this sense: (1) do not harm and (2) maximize possible benefits and minimize possible harms." - In practice, this means that it is not OK to use people for research unless the research is likely to have some benefit. Furthermore, this benefit must outweigh the risks.
- Justice: Ensuring that those who bear the risk in the research are the ones who benefit from it; ensuring that the procedures are reasonable, nonexploitative, carefully considered, and fairly administered.

A number of concepts such as confidentiality, anonymity and informed consent have emanated from these principles as a requirement for meritorious research. Researchers are expected to

adhere to these basic principles found in The Belmont Report. However, the extent of adherence may depend on the paradigm the researcher uses. In the post-positivist's view, the research is value-free, ethically neutral and unbiased in evaluating the level of subjectivity within the research. Values and ethics are excluded, avoided or denied as these are regarded sources of bias, which can disturb the epistemological goal of objective knowledge outcomes (Heron & Reason, 1997). Therefore, in a post-positivist analysis, the overall results within a given study are reflective upon the perspective of both the researcher and the participant. The researcher attempts to uncover facts without interfering with the participant's value system. Those who work with this paradigm, generally, use quantitative social science protocol to describe and infer regular patterns characterizing a social phenomenon. However, the constructivists assert that research cannot be value free and maintains that the researcher's preferences affect the entire research process (Christians, 2005). Beyond accepting existing ethical codes, the constructivist strives towards transparency of the requests and demands put on participants, and also applies ethics to the forms of knowing that the specific context of the inquiry requires.

4.1.5. My Philosophical Approach

After a review of the two opposing paradigmatic stances (objectivism-positivism and subjectivism-constructivism) described above, I believe it is imperative for me to reflect upon my own philosophical beliefs and disclose it to those reading this thesis. By knowing my worldview, one will be able to assess properly the choices that I made in my data collections, interpretations and conclusions. From the philosophical discussions in the previous section, it is clear that the traditions that have their roots in different kinds of paradigms create their own world-view that guide the choice of research approach, theories, methodology, and methods. Agreeing with the thoughts of Weber (2004), the difference between perceptions of positivism and interpretivism has become a legend. Both post-positivist and interpretive paradigms have their advantages and benefits which makes their differences vague (Mingers, 2001). The degrees of disparity between these paradigmatic positions and between paradigm and method over the last three decades; see for example, Burrell and Morgan (1979), with a strong association indicated between design approach and underlying paradigm position (Creswell, Plano Clark, Gutmann, & Hanson, 2003). For example, a quantitative approach implies the holding of positivist paradigm beliefs, whereas a qualitative

approach implies the holding of beliefs associated with a constructivist paradigm position. These relationships are though, by no means fixed (Bryman, 2004). However, I do not subscribe to the scientific notion that social inquiry was able to access the truth about the real world solely by virtue of a single scientific paradigm either positivism or constructivism (Mertens, 2009).

I believe that both paradigms and their respective methods can contribute to one's quest for knowledge and truth depending on the specific aspects of the phenomenon we seek to understand. I, therefore, agree with a relatively newer paradigmatic position identified as pragmatism. By pragmatism, my ontological position is somewhere in between the two extreme paradigms combining the ontological and epistemological stances of both the post-positivist and the constructivist paradigms. I think that observations are based on beliefs and theories are used to interpret data. I also believe that there is no absolute truth in social science and that the interactions between the researcher, research object and in this case the mobile technology perceptions will affect the findings. A clear philosophical distinction between my pragmatic paradigmatic position and the post-positivism and constructivism stances are provided in table 2.

As a pragmatist, I provide a pluralistic view of the phenomenon under research by mixing these approaches to better understand the research problem (e.g. Creswel, 2003). Thus, the current study takes the paradigm of pragmatism to understand the factors that influence the consumer's decision to accept and use mobile money services and to assess the effect of the phenomenon on their existing social practices by conducting mixed-methods research in a sequence. By adopting a pragmatist position, I agree with Patton (2002) that the quality of this study should be judged by its intended purpose, available resources, procedures followed, and results obtained, all within its particular context and specific audience. The pragmatism paradigm and mixed-methods are currently widespread in conducting social science research and specifically information systems research (Baert, 2005). The pragmatist posits that the most influential determinant of the research philosophy adopted is the research question - one approach may be better than the other for answering particular questions. In addition, the complexity of human behavior in a particular situation may not be fully captured through the use of a single paradigm (Maxcy, 2003). Pragmatism is generally seen as the philosophical underpinning for mixed methods studies (Tashakkori and Teddlie, 1998). In other words, for the mixed methods researcher, pragmatism

opens the door to multiple methods, different world-views, and different assumptions, as well as to different forms of data collection and analysis. Johnson & Onwuegbuzie (2004) note the philosophical position of pragmatism and mixed methodology would provide benefits to research methodologists and empirical researchers because:

- It offers an immediate and useful middle position.
- It offers a practical and outcome-oriented method of inquiry based on action and leads.
- If offers a method for selecting methodological approaches that can help researchers to answer the research questions.,

Table 4.1 Positions of Knowledge Claims and Philosophical assumptions

	Objectivism ⟷ Subjectivism		
Elements	**Post-Positivism**	**Pragmatism**	**Constructivism/ Interpretivism**
	(Clark, 2002)	Tashakkori & Teddlie 1998	Tashakkori & Teddlie 1998; Guba and Lincoln 1994
Ontology (Nature of Reality)	Critical or transcendental realism An objective reality exists Reality is constructed. Better reflect common understanding of both 'nature of reality' and social and behaviors.	Accept external reality, (post-positivist) Not an absolute unity Consider truth to be 'what works' or application and solution to problems Reality is multiple and constructed	Ontological Relativism Only multiple, subjective realities exist. There are multiple, constructed realities and they may change as their constructors change.
Epistemology (How to know)	Modified Objectivism Findings probably objectively 'true'	Both subjectivism + objectivism Knower and known must be interactive	Subjectivism The knower and the known are inseparable
Axiology (values in inquiries)	Inquiry involves value, but it may be controlled, since knowledge can be influenced by value ladenness inquiry, and theory ladenness of facts (Value- or Theory-laden).	Values play a large role in interpreting results. Since knowledge -Can be influenced by value-ladenness of inquiry, and theory ladenness of facts -is fallibile -is under determination of theory by fact (one set of data can be explained by many theories).	Inquiry is value-bound
Generalization	Time- and context-free generalizations are possible	Time- and context-free generalizations are impossible	
Methods	Primarily Quantitative	Quantitative and Qualitative methods are compatible	Qualitative methods

4.2. The Research Approach

Another aspect of explicating one's philosophical position in conducting scientific research is explaining the reasoning of the study since all scientific investigations rely on logical reasoning. Reasoning is the process of applying extant knowledge to draw conclusions, formulate predictions, or construct explanations. There are three key reasoning alternatives in social science inquiry - deductive reasoning, inductive reasoning and abductive reasoning. The deductive reasoning is working from the more general to the more specific (see figure 1). It starts with premises contained in the theories or models and then draws conclusions. In information systems research, deductive reasoning is most common with the application of theories like TAM, TPB and TFM to specific phenomena and human behaviors resulting in extensions to the existing models or theories. Hence, deductive approach requires a considerable deal of theoretical work before data are collected (Blaike, 2009). Theories applied can be from either a single source or multiple sources where relevant constructs from different models are combined to generate a framework to be tested. As in phase II of this study, after a considerable literature review, deductive reasoning applies to the phenomenon of interest to verify specific hypotheses developed from the TAM and general information systems adoption literature to generate an extended model of the TAM. The objective of this phase was to verify the generalizability of the constructs that exist in the information systems literature to the specific phenomenon of interest. The Abductive reasoning refers to the use of deductive and inductive logic to test hypotheses about the nature of a phenomenon (Drass, 1982).

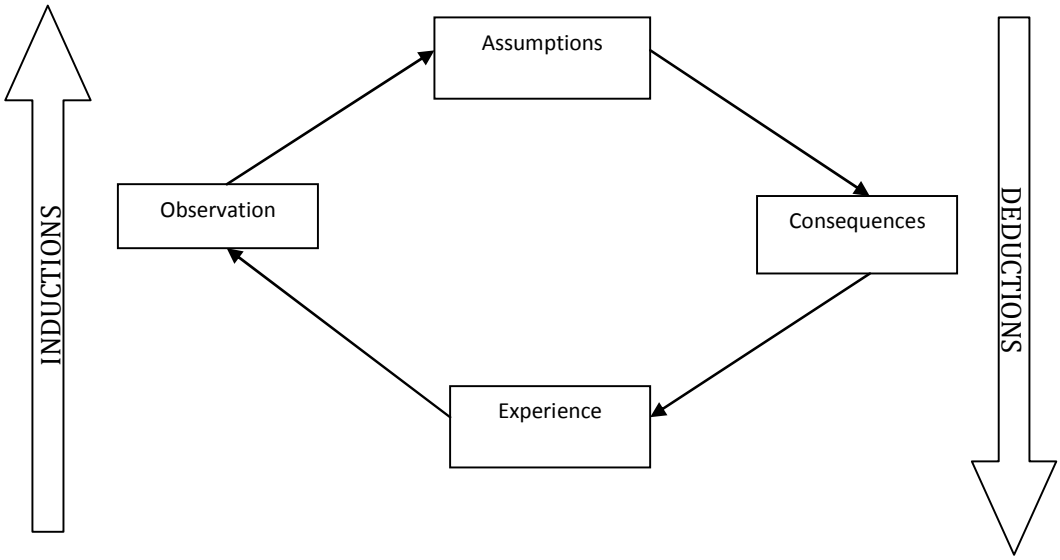


Figure 4.1 Relationship of Induction and Deduction (adapted from Rasmussen et al. 2006

In contrast, inductive reasoning starts with the collection of data, and, ends with descriptions of patterns in the data (Blaikie, 2009). Often, inductive reasoning is based on observation of signs. For example, weather forecast. Experiences (knowledge) lead to observations, which produce certain patterns that are developed into relevant theories or models. A crucial purpose of inductive reasoning is to consider what might be the cause of a problem. For example, whereas deductive reasoning can be necessary in determining the factors that affect consumer's acceptance of a particular technology, assessing, the meanings that the consumer places on the use of the technology are frequently based upon inductive reasoning. Although the factors can be identified with some amount of certainty, the meanings that the consumer places on the technology can only be concluded with a certain degree of likelihood or probability. Thus, the analysis of the phase III of this study is more of abductive reasoning. It is the purpose of this study to find and add new elements of interest to the theoretical discussion. Hence the study can be said to be iterated between deductive and inductive studies – also known as abductive reasoning, which is characterized by a constant movement between theory and observation (Dubois & Gadde, 2002). Abductive reasoning is used to discover why people do what they do with uncovering largely tacit, mutual knowledge and the symbolic meanings, motives, and rules that provide the orientations for their actions. People's logical experiences create perceptions that give new perspectives on the phenomenon. These perspectives are then captured into new models or theories by extending the existing theories or generating new models. The primary objective throughout the study was the development of theory through the deductive-inductive iteration.

4.3. Mixed Methods

Mixed methods research is a field of inquiry that uses both qualitative and quantitative methods to answer research questions within a single study. They are used increasingly for expanding understanding from one method to another to converge or confirm the findings from different data sources (Creswell 2003). The research is considered "mixed" because it uses quantitative and qualitative approaches in one or several of the following ways: it combines different types of research questions, procedures, data, analytical approaches, concepts or language (Johnson and Onwuegbuzie, 2004). One of the main advantages of using mixed methods is its ability to unite exploratory and confirmation research. Thus, in one study, a theory can be generated and tested at

the same time. Further, Charles Teddlie and Abbas Tashakkori have postulated that the use of mixed methods approach can mitigate the disadvantages that using quantitative and qualitative methods have by themselves. Also, they offer insight from divergent points of view and provide researchers with an opportunity to use supplemental research strategies. Thus, the use of mixed methods is to increase the possibility to achieve findings that are more trustworthy and relevant than using the approaches separately. Johnson, Onwuegbuzie, & Turner (2007) identified five general purposes for conducting mixed methods research, namely triangulation, complementarity, development, initiation, and expansion. Our adoption of mixed methods research for the current study was to provide triangulation (collaboration and convergence of results), complementarity (elaboration, enhancement and clarification), and expansion (expanding the breadth and range of inquiry).

The quantitative approach tends to be associated with the post-positivistic paradigm, employs strategies of inquiry such as experimentation and survey and methods of data collection that are pre-determined measures resulting in numeric data. By contrast, the qualitative approach tends to be associated with constructivist or the transformative paradigms, employs strategies such as the case study or narrative and uses methods or data collection such as the interview resulting in open ended data textual data. Thirdly is the mixed methods approach associated with the pragmatic paradigm and strategies that involve collecting data in a simultaneous or sequential manner using methods that are drawn from both quantitative and qualitative traditions in a fashion that best addresses the research question/s (Creswell 2003).

By practicing pragmatism, I acknowledge the different perspectives of positivism and constructivism and choose a quantitative research method (survey) to verify the application of existing theories of technology acceptance and adoption to the phenomenon of mobile money and then triangulate the findings with a qualitative method of data collection - focus group discussions. Further, in an interpretivist position, using an abductive reasoning apply a qualitative approach in acquiring in-depth explanation to how the phenomenon affects the social practices of consumers.

There are three different mixed method strategies in the literature, namely, sequential, concurrent and transformative mixed methods. I adopted a mixed method approach where quantitative and qualitative methods were used concurrently with the qualitative methods as dominant. Although

data was collected at different times of the research, and were used for the papers involved, integration of the qualitative and quantitative data only took place during the interpretation stages of the final thesis. The foundation for the use of mixed method is embedded in the nature of the current study. The study of the factors that influence the adoption of mobile data services is well advanced in the Information Systems literature, and any new studies should seek to be confirmatory rather than exploratory, hence the use of quantitative methods to confirm the applicability of existing factors. The first two stages of the study were quantitatively based exploring relationships between constructs that have already been tested in IS literature. Thus, they were deductive in nature. Given the newness of the phenomenon and its application in the emerging market it was necessary to assess whether existing constructs are generalizable to this unique context. However, given the same originality of the phenomenon required further exploration of the underlying motivations and beliefs of use and adoption. Perhaps there will be some new factors unique to this phenomenon. Thus, applying qualitative methods to the study offered greater insights and more specific information about the consumer's adoption process.

4.4. Research Design

The decision about the research design is directed by my paradigmatic stance - pragmatism, which considers truth to be 'what works' and provides a solution to the problem. In pragmatism, reality is multiple and constructed. Hence, what works at a particular time is determined by the research objective and the research question to be answered. Mixed model studies or Triangulation is employed as a product of the pragmatist paradigm and support this research inquiry, which combines qualitative and quantitative approaches within the different phases of the research process. The use of mixed method approach allows for flexibility in the design of the study. Further, Tashakkori & Teddlie 1998 posited that 'The mixed method approach would neutralize the biases of any single method, and provide insight into different levels or units of analysis'. Thus, various quantitative and qualitative data collection methods such as questionnaires, interviews, focus group interviews, document analysis and observations are employed to collect evidence in this research inquiry.

The overall design of the study is cross-sectional but embedded in different levels of triangulations (repeated cross-sectional studies, with different samples and aspects of the phenomenon). By

cross-sectional, I am interested in understanding the consumer's perception and use of technology at a point in time not necessarily how those variables change over time. The consumer's meanings and experiences in the use of the mobile money services will affect their continued usage. I attempt to analyze from a historical perspective the changes in the consumer's social practices as a result of acceptance and use of the service. That is, what are the changes in the consumers' practices as a consequence of his/her experiences of the phenomena. However, I am interested in the change at a particular time, not the temporal tendencies of the individual's behavior (Davies & Dale, 1994). Although, I recognize that a prospective longitudinal study of the individual's acceptance and use of mobile money services will increase our understanding of the effect of the phenomena on the consumer over time that was not an objective of the current study. The primary data gathered are guided by the specific research objective and its related research questions.

The primary objective of this research is to assess and explain the relationships between multiple aspects of a phenomenon (adoption and use of mobile money in a given context) to understand better, the causal mechanisms underpinning the phenomenon. It is also aimed at providing a clear understanding on the impact of the phenomenon on the social practices of its consumers. The overall research design and sources of learning are illustrated in figure 3. Upon presenting the sources of my conceptual and environmental study, I proceed to illustrate and carefully describe the mixed method field study conducted as the primary qualitative and quantitative data source for the study. The importance and reasons for the mixed method approach has been explicated in the previous sections.

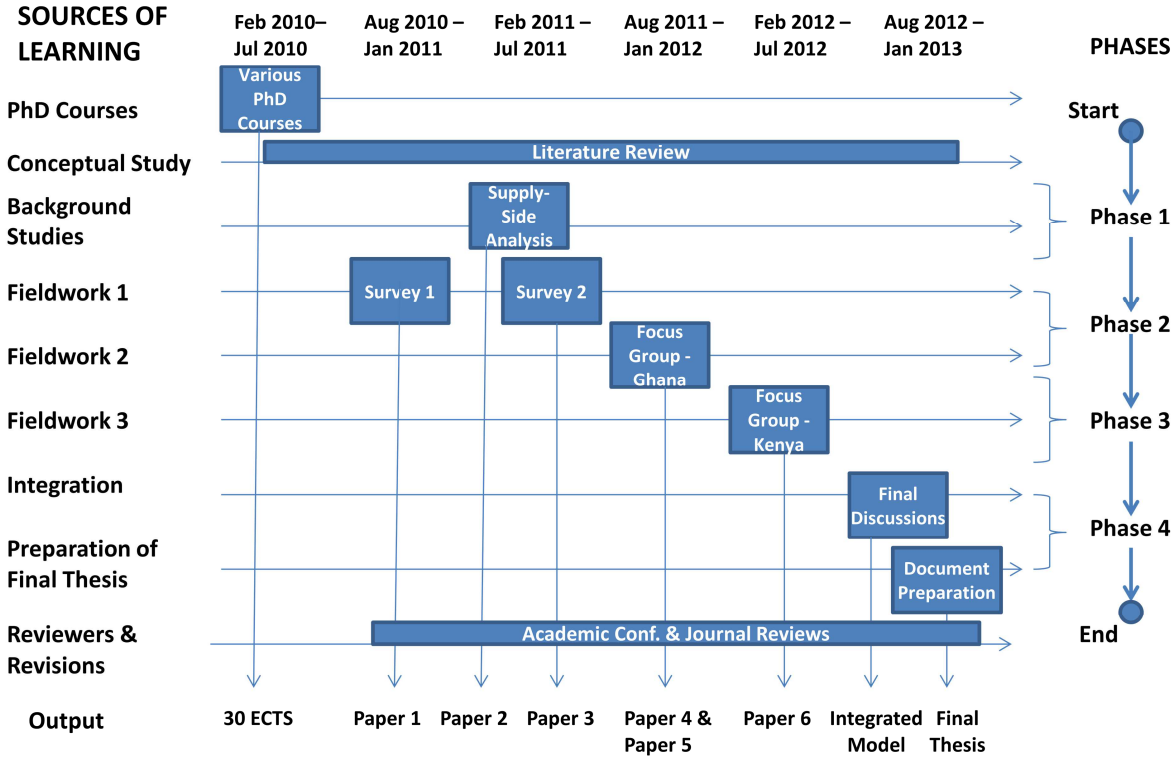


Figure 4.2 Overall Research Process and resulting outputs

4.4.1. Phase 1 - Background Study

A number of data collection techniques were engaged during this study. Multiple methods and sources were used in the data collection process. As shown in figure 3, the phase 1 of this study started with an environmental study of the phenomenon. Document analysis, a qualitative data gathering technique was employed in phase 1. Scholarly publications, industry reports and unpublished corporate documents for mobile network operators and other institutions were used in building my background knowledge in the context of the study (Mobile Money). They influenced my contextual understanding of the phenomenon and the relationship between the key actors of the mobile money ecosystem. Although this research inquiry is focused on the demand-side factors that influence the phenomenon, the phase 1 document analysis study provided insights into how certain supply side factors can also affect the adoption and use of mobile money services. Knowledge derived from these secondary sources was used in writing the paper 2.

Diffusion research in different disciplines and related practitioner reports points out that the relevance of supply side factors in explaining the process of adoption and diffusion of technological

innovations should be considered (Morawcyzski, 2011). Understanding the symbiotic relationship between the various actors in the mobile money ecosystem provided the necessary background information required for the series of fieldworks that followed. When comparing the differences in the rate of diffusion of technology in different countries it is necessary to understand how the symbiotic relationship of the actors influenced it. The relationship between the agents, banks, financial and mobile network regulators and operators were found to be significant in bring the service to the consumer.

4.4.2. Phase 2 - Fieldwork 1 &2 in Ghana

The corpus of primary data consists of data obtained from three periods of fieldwork. The different fieldworks were to provide data on the diverse perspectives of the phenomenon, thus, providing data triangulation. Denzin (1970) stressed that varied data sources to examine a phenomenon provides an additional level of data validation. The first two fieldworks, which make up phase 2 of the study, were undertaken in Ghana. At the time of the fieldwork three, mobile money services had just been launched in Ghana by (MTN, Tigo and Airtel) mobile network operators. The newness of the mobile money services in Ghana provided an opportunity to test existing theories in information systems on consumer's initial adoption of the technology. The first significant fieldwork took place between August 2010 and July 2011 and involved three survey instruments. Survey 1 and 2 were conducted to provide data on the key determinants of consumer adoption of mobile money by applying constructs from existing information systems literature on adoption. Separate questionnaires were used to provide data triangulation.

Survey 1 aimed at answering the research question 2 was based on key constructs from the technology acceptance model and the innovation diffusion theory. The items in the survey were developed by adapting existing measures validated by other researchers in mobile banking and mobile payment environment, or by converting the definitions of the construct into a questionnaire format. Drawing from the consumer innovativeness and the innovation diffusion theory, survey 2 aimed at providing data on the unique characteristics of early adopters of the mobile money services and their motivations. The survey 3 dubbed "mobile barometer survey" was used only to contextualize the research in chapter 2 and is not directly invoked in any of the selected papers. The items used in this survey were adapted from "The Mobile Barometer Survey" conducted in

Sweden and Japan. Data was gathered from both an online survey and distribution of questionnaires at various malls in Ghana. The aim of survey 3 sought to provide primary data to analyze the characteristics of the mobile society of Ghana in relation to usage. The outputs of phase 2 are papers 1 and 3.

Table 4.2 Summary of Data Collection Techniques

No.	Focus	Key Theoretical Reference	Data Collection Method	Related Research Question	Key Intent
1	Testing technology acceptance and innovation diffusion constructs in extant information systems literature.	Roger (2003); Davies (1989); Chen (2008); Cheng et al. (2006)	Self administered Questionnaire From three locations in Ghana (n=298)	Research Question 2	Seeks to explore the key factors that affect consumer behavior towards the adoption, and use of mobile money in Ghana.
2	Uncovering the unique characteristics of early adopters of technology and their motivations.	Rogers (2003); Mingling and Dowling (1978); Agarwal and Prasad (1998)	Telephone based questionnaire (n= 372 from MNOs Database) From different locations in Ghana (n=298) Total - n=644	Research Question 3	Identifies unique factors that influence the consumer's motivation to adopt a mobile data service.
3	Current use of mobile phone and services, role of phone in everyday life and the desired features and functions.	No clear theoretical reference. Descriptive data	Survey - Online Data Collection; (n=218) Participants in malls and streets (n=790) Total - n=1008	Only Contextual Information Provided input to chapter 2	Obtain quantitative data on mobile phone users in Ghana; to provide perspective on the characteristics of the mobile society of Ghana.
4	The acceptance of the mobile money services by the rural unbanked. Capturing their unique characteristics and motivations.	Inductive Approach Limited application of existing theory	Seven Focus Groups; 9 to 12 participants per group (n=67)	Research Question 2	Enrich the questionnaire data with more contextual insights; throwing light on the "other consumers" not captured in extant mobile banking and mobile payment literature.

To analyze the quantitative data collected in phase 2, a selection of analytical tools were used. The preparation of the collected data and the descriptive analyses were run using the SPSS version 18 for Windows. On the other hand, AMOS version 16 with a more advanced technique of Structural Equation Modelling (SEM) was used for the examination of the theoretical model and the hypothesis testing. SEM is a second generation data analysis technique (Bagozzi & Fornell, 1982) that provides many advantages over the traditional first generation statistical tools such as regression, ANOVA and MANOVA.

The data collected from the questionnaire surveys in fieldwork 1 helped to present a broad picture of consumers' perceptions of various concepts in the study and established the empirical validity of existing technology acceptance and adoption constructs in IS literature. It extended the generalizability of the IS adoption constructs to the current phenomenon. However, questionnaires are known for the constraining of the collected data and insights into a set of pre-determined questions. Therefore, to complete the picture of the key motivating factors of mobile money adoption, qualitative data were collected in order to enrich the questionnaire data with more contextual insights. Thus, fieldwork 2 adopted focus group discussion as the data collection technique to provide a more versatile rich data (Homer, 2008) The phenomenon as advertised in the Ghanaian market was geared towards bringing financial services to the unbanked, "banking the unbanked". Thus, the heart of the focus group discussions was to explore the factors that are likely to affect the rural unbanked acceptance of the technology. Seven focus groups (between 9 and 12 per group), Table 4.2, were conducted for approximately 180 minutes per session with 69 participants. During the focus groups, I demonstrated the use of the application to the participants. The outputs of fieldwork 2 are papers 4 and 5.

Table 4.3 Characteristics of Fieldwork 2 Participants

	No. of Participants	Land Ownership	Female	Male
AKorley Waterworks	10	0	3	7
Akorley Ayiti	12	4	4	8
Yawkoko	9	5	4	5
Teacher Mante	9	0	2	7
Asukesu	10	6	2	8
Wassaman	10	5	3	7
Heman	9	4	3	6

Table 4.4 Characteristics of Fieldwork 3 participants

	Machakos Choir	Mutituni Chapel	Machakos Bus Station	Total
Number of Participants	25	12	7	44
No. of Participants with Mobile Phone	22	10	6	38
No. of Participants with multiple SIM	12	5	5	32
No. of Participants with Bank Account	12	6	6	24
% of Participants who have used Mobile Money	90%	75%	85%	83%
% of Participants who have used mobile money for topping up their credit	95%	75%	85%	85%
% of Participants who have been refused a Bank Account	67%	45%	40%	51%
% of Participants who have cash-in/cash-out - mobile money transfer	90%	75%	85%	83%
% of Participants who have transferred money to and from their bank account	35%	38%	45%	39%
Frequency of Use (Average)	At least twice daily	Everyday	At least once a day	daily
Max. Amount transact using M-PESA (KES)	45000	10000	33000	
Min. Amount transact using M-PESA (KES)	100	100	50	

The last substantial fieldwork was carried out in Kenya. The aim of this stage was to ascertain in-depth insight into the use of the technology and how it has affected the social practices of its consumers. Since the introduction of mobile money was at its teething stages in Ghana, data on how its consumption is affecting consumers' social practices were not readily available. In contrast, Kenya, through Safaricom's M-PESA had experienced usage of the phenomenon for more than four years at the time of the study. Existing literature had reports of usage of mobile money in Kenya (Mas and Radcliffe, 2010). In this phase, I collected information related to how users used the mobile money services and changes in their social practices as a result of their adoption of the service. Thus, in order to have access to different types of information regarding users' experience I adopted the combination method followed by (Carroll, Howard, Vetere, Peck, & Murphy, 2002) who combined qualitative methods of focus group, interviews and observations. The phase 3 included 3 focus groups, 6 interviews and observations. The phase started with a trip to Kenya in

April 2012 and a subsequent recruitment of two research assistants. The role of the assistance was to assist in locating the appropriate areas for the focus groups and to provide translation services. After several deliberations, the research assistance agreed on the most appropriate area for the study. They selected the Machokos District. Machokos is well known for diverse use of the mobile money services and is also convenient for one of the research assistants. Machokos was also appropriate for information on the usage of the services by both the banked and the unbanked. The participants of the 3 focus groups were all from the same ethnic group of the Akambas. Table 4.4 shows the basic characteristics of the participants from the 3 focus groups. Paper 3 was an output of the phase 3 fieldwork. The domestication approach and its dimensions of appropriation, objectification, incorporation and conversion were used as the theoretical lens for this phase (Haddon, 2006; Silverstone, 2005).

4.4.3. Phase 4 - Integration and Theory Development

The final phase of the study involved a thorough analysis of the papers and their contributions. With reference to literature and existing theoretical concepts I sought to provide a more comprehensive and integrated model of mobile money adoption. This analysis involved an iterative exercise of comparing the findings with the literature and assessing the limitations of existing theories in explaining the consumer adoption process. The phase also involves the writing of the final thesis. Providing a coherent picture of the entire study with the description of the methodologies used the contextual information and conclusions from the study.

5. Summary and Contributions of each Paper

This thesis contributes to the understanding of technology use and adoption, and the process by which individual users make ICT decisions by introducing the integrated mobile data services model, which provides an understanding of the subjective, potentially irrational, value judgments and cognitive decision processes that guide the decision to adopt and consume mobile data services.

5.1. Paper 1

Modeling the Adoption of Mobile Money Transfer: A Consumer Behavior Analysis
(Mobile Communication Technology for Development, November 10-11, Kampala, Uganda, 2010)

5.1.1. Description

The introduction of prepaid cards and the fallen prices of mobile handsets have led to a rapid spread of mobile phones in the emerging economies. This has opened up diverse opportunities for them to be used over and above voice communication. One of such uses, which have emerged lately, is the use of mobile phones in financial services. This paper explored the key factors that affect the Ghanaian consumer's acceptance and use of mobile money transfer by extending using key determinants from TAM and DoI theory. We analyzed the data using a Structural Equation Modeling (SEM) to evaluate the strength of the relationship between the constructs. The results were in support of the key TAM and DoI constructs.

5.1.2. Methods

A survey was developed for the data collection. The survey was conducted in Ghana Context. The data from the survey were tested using Structured Equation Model, and the unit of analysis was the prospective individual mobile money transfer customer in Ghana. In developing the model, we reviewed existing literature extensively and then interviewed Mobile Money professionals of telecom providers who have either launched or about to launch their products and a selection of consumers. Based on the results of the interviews we developed our survey instruments using a multiple-item, five-point Likert scale approach. The items in the survey were developed by adapting existing measures validated by other researchers in mobile banking and mobile payment environment, or by converting the definitions of the construct into a questionnaire format. Data

was collected using a self administered questionnaire to the general public at malls and other places. In total, 330 respondents were approached in the survey. A total of 302 accepted to participate, and final 298 were collected.

5.1.3. Findings

The structural equation modeling with AMOS 18 in this study supported the results of previous extended TAM research with the TAM constructs significantly affecting the consumer's behavioral intentions. Further, the perceived ease of use and relative advantage constructs where antecedents of the perceived usefulness construct with the perceived ease of use having the greatest impact on behavioral intentions both directly and indirectly through perceived usefulness. Perceived risk, perceived trust and perceived trialbility is the other antecedents to behavioral intentions found in this study.

5.1.4. Contributions

This study intended to be a valuable source for further empirical and conceptual research on mobile money transfer services. Besides its general contribution of identifying, conceptualizing and operationalizing the key factors that predict its acceptance and adoption in the emerging markets, the results can be used for further investigation into the success and or failure of other mobile money related services. It provides further understanding into the attitude of the Ghanaian consumer towards mobile data services in general and the use of mobile phones for financial services specifically.

5.2. Paper 2

Understanding the mobile money ecosystem: Roles, Structures and Strategies (International Conference on Mobile Business, Como - Italy, 2011)

5.2.1. Description

During the past decade, mobile money has expanded to over 32 countries in the developing world (Mas and Radcliffe, 2010). It is, therefore, topical to discuss the emerging mobile money ecosystem, its structure, and roles for the key players of the system. The main question is, how the structure of the mobile money system is evolving, and what strategies can its key players adapt to ensure sustained robustness and productivity for all? In answering this question, the paper discusses the

nature of the mobile money business, the incentives and the roles of its key players drawing from the work of Iansiti & Levien (2004). Mobile money as a business ecosystem depends on the interconnectedness of the consumers, mobile network operators, banks, agents, merchants and the regulators being the key players in the system. The health of the ecosystem determines the health of the individual parts within the ecosystem and vice versa.

5.2.2. Methods

A series of unstructured interviews, literature reviews and general observations were used in describing the nature of the mobile money ecosystem using M-PESA as a case study. Further analysis was later done using the dimensions of symbiotic relationships developed by Fransman (2007).

5.2.3. Findings

The findings of the paper indicate that the MNOs have a pivotal role to play in the development of the mobile money services and have to be a keystone player for the mobile money to be successful. It noted that, the success of M-PESA can be partially attributed to the role of Safaricom as a keystone player in the M-PESA mobile money ecosystem. Further, it identified the role of the MNO as a keystone is to develop strategies that will foster the creation and development of niches in the mobile money ecosystem. Applying Fransman (2007) symbiotic relationships, we described the relationships between the key players of the mobile money ecosystem and identified the symbiotic relationship between the customer and the agent as the determinant of the strength of the mobile money ecosystem.

5.2.4. Contributions

This paper describes the ecosystem of mobile money by identifying the key players in the ecosystem, their roles and symbiotic relationships between these players. As much as we know, there has not been any application of the ecosystem concept to the mobile money services domain in the extant literature. Further, the level of detailed descriptions of the key players and their relationships provides an immediate in-depth knowledge on how the mobile money system operates to any reader who has no insight on this phenomenon. For practical contributions, this paper provides some insight to MNOs and banks the keystone strategies that are most appropriate for the success of mobile money operations.

5.3. Paper 3

Understanding the Characteristics of Early and Late Adopters of Technology: The Case of Mobile Money (International Journal of e-Services and Mobile Applications, 2012)

5.3.1. Description

The newness of the mobile money innovation provides an opportunity to contribute to the innovation diffusion literature by examining the characteristics of its early adopters. One of the key antecedents of technology adoption identified in literature is the psychometric and demographic characteristics of the individual. It is thus both challenging and topical to explore the characteristics of Mobile Money users at this early market stage and to identify potential predictors of further adoption and, eventually, mass acceptance of this phenomenon. Understanding the key characteristics of early adopters is obviously of theoretical and practical relevance to behavioral science (Bartels & Reinders, 2011). From a theoretical perspective, it will enable researchers to develop richer theoretical models to explain the adoption behavior across different types of consumer products (Agarwal & Prasad, 1998). It will also assist practitioners to target the relevant consumers to facilitate the diffusion of an innovation. Specifically, this study looks at its application to a mobile money service.

5.3.2. Methods

A survey instrument was adopted for this study. This study explores the individual characteristics of the early and late adopters of the Mobile Money services introduced by Zain in Ghana. In addition, by applying Roger's operationalization of innovativeness as time of adoption, we considered the first 2000 users of the mobile money services as earlier adopters and the rest of Zain's customer database as later adopters. These items were adapted from the work of Manning, Bearden, & Madden (1995) in which the measures were found to have high reliability. Data was collected using both telephone interviewing technique and by a self administered questionnaire at malls and other places. Five hundred users from the customer database were called, and 372 agreed to participate in the study. In addition, four hundred questionnaires were distributed at various places within Accra and Kumasi (major cities in Ghana) and 298 responses were received. In all, 644 responses were included in the study.

5.3.3. Findings

Concerning demographics, the findings point out that a young graduate level educated male is more likely to be an early adopter of mobile money services in Ghana. This assertion means even though the main purpose of introducing the product in Ghana is to bring financial services to the unbanked, the younger educated male in the urban areas have been targeted first before they can carry it to their families in the rural areas. Merritt (2010) study of M-PESA in Kenya concluded that most of the early adopters were found to be young educated males contrary to the original targets of the service. In addition, users who adopt mobile money services earlier than others have higher levels of Independent Judgment Making, Novelty Seeking and Opinion Leadership than those who adopt later.

5.3.4. Contributions

This study contributes towards the innovativeness literature by using the structured equation model in analyzing the demographic and psychometric properties of the early adopters of mobile data services. At the time of this study, we knew not of any study on mobile data services that have done the same. Furthermore, most innovativeness studies were found to be based on technologies that had been with the population for an unusually long time before the studies. This was that first study that we know of where the technology was truly new in the community of study.

5.4. Paper 4

The Adoption of 'Transformational Mobile Banking' by the Unbanked: An Exploratory Field Study (Communication & Strategies, 2012)

5.4.1. Description

Transformational mobile banking is defined as the ability to "bank the unbanked" i.e. bringing financial services to the unbanked using mobile phones (Porteous, 2006). The number of people with mobile phones far exceeds the number of the unbanked in most developing countries due to the rapid spread of mobile technology in recent times. This study focuses on the adoption of mobile banking in Ghana, suggesting that the transformational potential of m-banking for people in rural areas, must be considered in the light of, whether barriers in addition to, access, are being addressed.

5.4.2. Methods

The main purpose of this qualitative research is to discover the deeper motivations and associations that underlie an unbanked consumer's intentions to adopt mobile banking services. The use of open-ended questions in the group discussions allowed participants to explain, comment and share experiences, attitudes, opinions, and beliefs, with specific focus on the consumer (his cognition and emotions because of the consumption intentions). Focus groups provide an opportunity to capture the meaning that consumers give to different aspects of reality they live in through group dynamics and interactions.

5.4.3. Findings

It demonstrates that affordability is an issue, but so too is issues of trust in the banking system and the convenience offered by the service. Among the reported barriers, only some are related to technology such as persistent network fluctuations. Others are related to the environment in which m-banking is used and the characteristics of institutions and agents, e.g. the effect of the loss of a mobile phone, unauthorized use, or the fear of mistakenly transferring funds.

5.4.4. Contributions

In order for MNOs to provide m-banking service, which is transformational, they need to understand who the unbanked are in the developing world. The main contribution of this paper is its discovery of the unbanked, their characteristics and barriers to becoming banked and also their inherent barriers of using m-banking services. It identifies technology anxiety and risk of incorrect transfers as the key barriers of m-banking becoming transformational.

5.5. Paper 5

Towards a model of adoption in mobile banking by the unbanked: A Qualitative Study (info - The journal of policy, regulation and strategy for telecommunications, information and media, 2012)

5.5.1. Description

This paper presents a qualitative study on mobile banking technology acceptance by the rural unbanked. The number of mobile phone users has long exceeded the number of people with bank

accounts across the world. The purpose of this paper is to determine the factors that will affect the acceptance of mobile banking by the rural unbanked. The demand for mobile banking services by the unbanked can be linked to their demand for savings and loan services. Therefore, for successful adoption of mobile banking by the unbanked, operators should promote the use of mobile banking services for savings and loans. Firms should further consider educating consumers through demonstrations and training to better equip them to master mobile banking systems. Once consumers feel competent in utilizing the system, they would find it easier to use and will be encouraged to use it.

5.5.2. Methods

The main purpose of this qualitative research is to discover the deeper motivations and associations that underlie an unbanked consumer's intentions to adopt mobile banking services. The use of open-ended questions in the group discussions allowed participants to explain, comment and share experiences, attitudes, opinions, and beliefs, with specific focus on the consumer (his cognition and emotions as a result of the consumption intentions). Focus groups provide an opportunity to capture the meaning that consumers give to different aspects of reality they live in through group dynamics and interactions.

5.5.3. Findings

The findings of the study indicate that perceived usefulness and perceived ease of use from the technology acceptance model, economic factors and trust influence the rural unbanked's intention to adopt and use mobile banking services. Further findings point out that perceived economic factor is likely to have a greater influence on the behavioral intentions of mobile money adopters over and above the regularly accepted, perceived usefulness and perceived ease of use constructs.

5.5.4. Contributions

The value of the paper lies in the use of a focus group discussion to unveil new determinants of technology acceptance by the rural unbanked and the identification of convenience and affordability as antecedents to perceived usefulness. Furthermore, it identified trust as a major determinant of the rural unbanked's intention to adopt the services and found that the MNOs and

network quality are vital antecedents to trust in mobile money services. The paper contributes to the ongoing discussions on the factors that affect consumer's intentions to adopt specific mobile data service - mobile money. Another major contribution of this paper lies in the discovery of perceived economic factors (PEF) as a determinant of behavioral intentions. The perceived economic factor referred to the availability of surplus money as a determinant in adopting mobile banking. The following propositions were made which led to the proposed extended TAM for mobile banking:

- P1. Perceived Economic Factor (PEF) has a significant and direct effect on the intention of the rural unbanked to adopt mobile banking services.

- P2. Perceived Usefulness has a significant and direct effect on the intention of the rural unbanked to adopt mobile banking services.
- P3. Perceived Ease of Use has a significant and direct effect on the intention of the rural unbanked to adopt mobile banking services.
- P4. Perceived Trust has a significant and direct effect on the intention of the rural unbanked to adopt mobile banking services.
- P5. Perceived Usefulness of the rural unbanked is determined by the level of convenience (con) and affordability (aff) derived from mobile banking services.
- P6. The age and gender of the rural unbanked affects their Perceived Ease of Use of mobile banking services.
- P7. Perceived Trust is determined by experience in MNO and experience in the Local Agent.

5.6. Paper 6

Investigating the Use and Adoption of Mobile Money in Kenya: A Domestication Approach (International Journal for Wireless and Mobile Computing, Inderscience; accepted)

5.6.1. Description

This paper represents the mobile money use and conversion aspects of the research. As stated earlier, the aim of this study is to examine the adoption and use of mobile data services through the lens of a new phenomenon known as mobile money services. The two data collection phases in

the PhD research designed involved data collection in Ghana and Kenya. The Kenya aspect of this study is to provide data on actual user experiences of the phenomenon. This paper is the output of the data gathered from the Kenyans' experience of the mobile money services. Using a focus group discussion, the paper sought to examine how the use of the services by a community is changing their social practices of money. Drawing on the Domestication approach and literature on the social construction of technology, the paper explains the trajectory of consumer adoption and use of the mobile money services in Kenya through the dimensions of the domestication approach.

5.6.2. Methods

As the interest lies in understanding individual consumer's experience in mobile money adoption process, focus group discussions and face-to-face interviews were considered most appropriate. Previous studies have shown that focus group discussion is an accomplished methodology for studying innovative mobile services (Jarvenpaa & Lang, 2005). The use of open-ended questions in the group discussions allowed participants to explain, comment on and share experiences, attitudes, opinions, and beliefs, with specific focus on the consumer (cognition and emotions associated with consumption intentions). The focus group discussions took place in Machakos and Mutituni (a 10mins matatu (taxi) journey from Machakos) all within the Machakos district. For the purpose of this study, Mutituni is considered, as part of Machakos. Machakos is located 64kms South East of Nairobi, the capital city of Kenya.

5.6.3. Findings

From the findings of this study, the individual behavior in relation to its interaction with the mobile money service can be divided into three kinds of behavior i.e. Appropriation (acquisition), Incorporation (consumption) and conversion (adoption). However, the social environment and its unique practices, routines and structures collectively affect the behaviors. Further, satisfaction was identified as a critical evaluative construct that iteratively connects and individual's incorporation stage with the conversion stage. Although satisfaction is not a dimension that is found in the early models of domestication, it can be argued that the extent to which an individual will incorporate a technology into their everyday life will depend on their continuous evaluation of how well it fits into his or her everyday practices.

5.6.4. Contributions

This article presents a number of contributions to how the consumer in its micro-societal environment accepts and consumes a mobile data service. First, it presents findings that provide empirical support that adoption can be best explained as a process, which includes an initial appropriation, consumption and adoption. However, instead of a linear process, it recognizes the link between the expressiveness of consumption that links adoption back to appropriation through commodification. Thus, providing empirical support for Silverstone's (2006, p.), argument that consumption is a cycle. Second, it supports Silverstone (2006) notion of moral economy and extends it to an individual's moral economy in a personal private context. Third, it shows the influence of social networks, daily practices, and norms, in all phases of the adoption process especially in the rural unbanked's adoption of mobile money context. To the best of our knowledge, this article represents the first application of the domestication approach to mobile data services. Although, Ling (2004) and Ling (2008) used domestication approach in analyzing mobile phone adoption they concentrated on the mobile phone as an artifact not as a service. Further, Pedersen (2005), Nysveen and Pedersen (2003) and other researchers apply aspects of the domestication approach to mobile data services this is the first article that seeks to analyze the entire adoption process using the domestication approach.

6. Discussions and Inferences

6.1. Introduction

This chapter provides a discussion of the findings of the research and provide a link between the objectives, the findings and where necessary some contributions that can be derived from the findings and analysis. Underpinning the objectives of this research described in chapter 1 is the attempt to demonstrate how a newer form of technology is used and adopted within a context, which is perhaps hostile to alternative solutions, which are taken for granted in the developed economies. Beyond adoption and use is an understanding in the context of use in which technologies are introduced, like existing social practices of consumers, societal norms, habits and conscious patterns of use, and decisions whether to acquire a product, a service or not (Veeberk and Slob, 2005). Therefore, the technological environment and the individual characteristics meet within a social context to produce the phenomenon under study. It is therefore, imperative that any research that seeks to explain the consumer behavior in a given context should have a balanced representation of the individual, technology and social concepts. The various aspects of the research are culminated into a model that seeks to explain the process of adoption of the mobile money services.

In the analysis and discussions that form the basis of the model, I adopt a position that technology acceptance, use and adoption can be best explained as a process with discrete steps. However, departing from the studies that heavily criticize the variance approach (Blechar, Knutsen, & Damsgaard, 2005; Hynes & Richardson, 2009), I maintain the use of variance approach to provide some level of explanations and generalizability to the key concepts of the process and identify the difficulties in operationalizing some of the qualitative concepts like symbolic meaning, social networks and daily practices. The combination of more generalized concepts like perceived usefulness and innovativeness with the rich contextual concepts like daily practices and the individual's functional and symbolic meanings is what makes the integrated mobile money adoption model (iMoMAM) a unique model.

6.2. Integrated Mobile Money Adoption Model

6.2.1. Introduction

In this chapter, we revisit, expand and combine findings from the research papers with the pre-understanding of Chapter 3 and propose the Integrated Mobile Money Adoption Model (iMoMAM) a modified version of the initial theoretical framework that guided this research. Developments in theory are offered by nesting key themes of the research papers with the technology acceptance, use and adoption outcomes presented in the theoretical framework of the pre-understanding. The integration of theories to present a richer understanding of phenomena is well accepted in IS research. For example, Venkatesh et al. (2003) integrated eight existing adoption and technology acceptance related models to create the UTAUT. Furthermore, Wixom & Todd (2005) integrated two research areas i.e. satisfaction technology acceptance and user satisfaction to provide a richer understanding of information system usage.

As explained earlier, most studies on mobile data services acceptance, adoption and use draw from either the evaluation of social psychological beliefs on the basis of theories like TPB (Ajzen, 1991; Pedersen & Nysveen, 2002; D. H. Shin, 2009) and TAM (Kwon & Chidambaram, 2000) or diffusion research (Dearing, 2009). If not, they may undertake a qualitative study which aims at providing an understanding of the consequences of the interaction between technology and the end-user that leads to consumption and adoption. The approach applied in this study is to integrate the two perspectives looking at a process model with identified key determinants at each stage of the adoption process.

The iMoMAM is a mobile money services adoption theory with a specific emphasis on the end-user being a consumer, a social network member and a technology user. It is integration of technology acceptance model, diffusion of innovation, expectancy confirmation model and the domestication approach. The choice of constructs and the corresponding relationships is created with triangulation perspectives in mind. Thus, limiting its generality to a substantive theory created for a consumer of mobile money services (A. S. Lee & Baskerville, 2003). A unique feature of this process model is its intention to provide antecedents of each stage of the adoption process and the combination of positivist and interpretivist aspects in one model. The iMoMAM is a blend of an explanation and prediction information systems theory, which aims at providing some predictions

and has both testable propositions and causal explanations (Gregor, 2006). The iMoMAM is different from the innovation decision process, in that, apart from focusing on the consumer; the iMoMAM integrates the innovation decision process with the innovation characteristics determining the factors that influence the formation of each of the stages in the process.

The iMoMAM postulates that the consumer usage experience is a series of behavioral intentions, initial use, satisfaction, incorporation and adoption. The first assumption of this model is in the definition of adoption. A consumer reaches an adoption stage when the technology develops into his or her preferred method of performing the particular behavior. Thus, he or she has selected among alternatives the preferred method of achieving a goal. Initiating the process is the first evaluation, based on beliefs (recognized as the technology acceptance stage) that lead to forming a behavioral intention to use the service. Followed by the initial use (trial or experimentation), another evaluation (satisfaction) takes place. If satisfied, the consumer will proceed to incorporate the service into his or her daily activities, as appropriate. The second assumption is that the consumer continual use is equivalent to the incorporation stage of the domestication approach described in chapter 3. Thus, by continual use, the consumer is incorporating the mobile money service into his or her daily practices. Empirically, satisfaction precedes incorporation as discussed in paper 6 and later on in this chapter. The service then becomes the consumer's preferred method of achieving that particular goal (Adoption). However, the iMoMAM recognizes that adoption like conversion in the domestication theory is not a static stage in the adoption process. There are constant iterative interactions between the satisfaction, incorporation and adoption phases. The third assumption is that technology and consumer mutually shape each other in consumption.

As explained under the methodology chapter, the study involved three field works; the first two sets of fieldwork took place in Ghana where the mobile money service had recently been deployed. The recent deployment of the service provided an opportunity to test the consumers' beliefs and perceptions of service prior to usage. This aspect of the study concentrated on first testing the generalizability of the existing technology acceptance constructs and secondly, identifies any unique determinants that may arise because of the context of the application. We adopted a sequential mixed method approach, which started with quantitative data collection followed by a qualitative data collection, in this phase. The key aspects of technology acceptance that were covered are consumer characteristics, Paper 2; technology characteristics, Paper 1, Paper 4, Paper

5 and Paper 6; Social Influence, Paper 5; Economic Factors, Paper 5; and some aspects of the supply side factors, paper 3. The third and final fieldwork took place in Kenya where we gathered data on consumers' usage experience, Paper 6. A qualitative data gathering technique was adopted in Fieldwork 3.

The proposed iMoMAM has three stages with five phases in all. The stages are technology acceptance, use and adoption. More so, the phases are behavioral intentions, initial use, satisfaction, incorporation and conversion. iMoMAM, posits that an individual adoption of mobile money services is a process which begins with technology acceptance through actual consumption of the service to adoption. This involves an initial evaluation of the attributes of the MDS to form a behavioral intention to use the service. The intention leads to initial use. After the initial use of MDS, the individual will evaluate his or her satisfaction of the service to decide continual usage or rejection of the service. A series of continual usage will lead to the consumer having the services embedded in his or her everyday life, hence conversion. The embeddedness of the service in an individual's everyday life involves a series of satisfaction evaluations, which will shape the interactions between the individual and the MDS.

6.2.2. Technology Acceptance Stage

The input to the iMoMAM is the technology acceptance stage. Technology acceptance refers to the beliefs and perceptions that lead to the consumer forming behavioral intentions to use the mobile money services (Venkatesh, 2003). Based on the research question 2, the quest to identify the key determinants of the consumers' behavioral intentions were undertaken in fieldwork 1 and 2 described in chapter 4. The two fieldworks resulted in papers 1, 3, 4, and 5. The findings of paper 1 identified the key determinants of technology acceptance of the phenomenon as Perceived Usefulness (PU); Perceived Ease of Use (PEoU), Perceived Trust, and Trialbility. Moreover, also identified are Relative Advantage and PEoU as antecedents to perceived usefulness. All the constructs identified in the paper 1 have been used and identified as antecedents to consumer behavioral intentions in the extant literature, however, as far as we are aware, this was the first time they have been applied to the phenomenon of interest. Thus, we tested the generalizability of the technology acceptance constructs. These determinants are identified as part of the technology characteristics determinants revealed in chapter 3.

Paper 3, based on the research question three, sorts to identify the key characteristics of the early adopters of mobile money and their antecedents to mobile money technology acceptance and use. As stated in chapter 3, individual characteristics are subdivided into psychometric and demographic characteristics. Regarding psychometric characteristics, the paper identified novelty seeking, opinion leadership and independent judgment making as the key differentiators between the early and late adopters of mobile money. From literature, the novelty-seeking construct, and the independent judgment making constructs are dimensions of personality traits (Manning et al. 1995). The findings imply that the early consumers of mobile money do not rely on others for information and assistance when making a decision to acquire the service. Thus, personality trait innovativeness is significant determinants of behavioral intentions. Further, age, education and income acknowledged as demographic factors that distinguish early adopters from its late adopters. The relationship between personal innovativeness, measured as mobile service innovativeness and behavioral intentions was not significant in this study. Furthermore, the findings of the focus group discussions reported in Paper 5 indicate that two demographic factors - age and gender moderates the relationship between PEoU and behavioral intentions as revealed in Venkatesh et al. (2003). In summary, consumer characteristics in the form of demographic factors and personality traits innovativeness were to have significant influence on his or her behavioral intentions to use mobile money services.

We sought further insight into the acceptance of mobile money services through a series of focus group discussions undertaken as part of fieldwork 2. The findings of fieldwork 2 resulted in Papers 4 and 5. The new determinants of behavioral intentions identified are perceived economic factor, network quality, perceived relationship quality. Affordability and convenience were found to be antecedents to perceived usefulness. Interestingly, whereas social influence was not identified as a key construct in fieldwork 1 and 2, it was revealed as the main determinant of mobile money services acquisition in fieldwork 3. It is thus, considered as one of the determinants of consumers' behavioral intentions to use mobile money services.

As identified in the extant literature, perceived trust was found to be a significant determinant of consumer behavioral intentions (C. Kim, Tao, Shin, & Kim, 2010). In Kim et al. (2010), trust is defined as a feeling of security and willingness to depend on someone or something. In paper 5,

this definition of trust was significant for the rural unbanked to use the mobile money services. Largely, the newness of the technology coupled with the level of education of most of the rural unbanked, provide trust in both the service provider and the local agent as a major determinant of their intention to use. Most of the respondents in the focus groups identified this determinant as the most significant determinant similar to the findings of (G. Kim, Shin, & Lee, 2007). Kim et al. (2007) make a further distinction between initial trust and experiential trust. Whereas consumers with no prior experience with either mobile phones and or formal banking services will have to overcome initial trust, existing consumers (either mobile phone or banks) need to overcome experiential trust. Furthermore, empirical evidence from the focus group in Kenya, shows that most early adopters in M-PESA did so because of the level of trust they had in Safaricom as a network provider. In addition, their experience in the use of top-up credit for the phones was quite similar to the M-PESA concept; this gave them experiential trust, which influenced their adoption of the mobile money services. Surprisingly, perceived cost, which is defined by Luarn & Lin, (2005) as the extent to which a person believes that using mobile banking will cost money was found not to be important in determining the rural consumer's behavioral intentions. Identifying the rural unbanked as in the bottom of the pyramid category, one will expect them to have low purchasing power and be price sensitive (see Karnani, 2009). However, perhaps the instrumentality of the mobile money services outweighed the importance of their perceived price. Similarly, most of the unbanked were found to spend a significant amount of their earnings on making phone calls (see Paper 4).

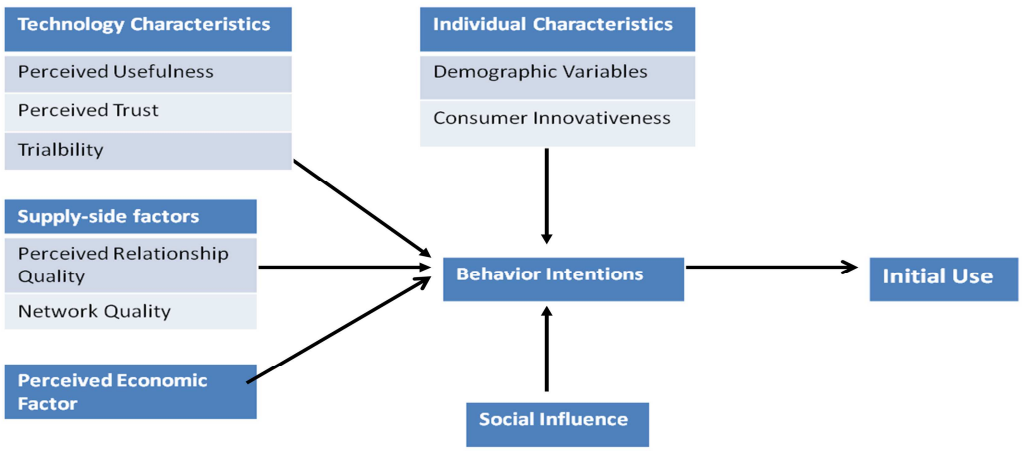


Figure 6.1 Technology Acceptance determinants

The table below shows all the examined constructs of technology acceptance and the groupings:

Table 6.1 Definitions of Technology Acceptance Constructs

Group	Constructs	Definitions
Technology Characteristics		
	Perceived Usefulness	The degree to which a person thinks that using a particular system will enhance his or her performance.
	Perceived Ease of Use	The degree to which a person believes that using a particular system will be free of effort.
	Perceived Trust	A measure of the consumer's level of assurance that the service will be provided with minimum possible hindrance.
	Relative Advantage	The degree to which the innovation is perceived as being better than the practice it supersedes.
	Trialbility	The degree to which an innovation may be experimented with on a limited basis before making an adoption (or rejection) decision.
Consumer Characteristics		
	Consumer Innovativeness	The degree to which an individual makes innovation decisions independently from the communicated experience of others.
	Demographic Factors	Education, age and gender.
	Perceived Economic Factor	The perception of surplus money required to use mobile banking services.
Social Factor		
	Social Influence	The extent to which members of a social network (eg, peers, colleagues, family members, or other referents) influence one another's behavior to conform to the community's behavioral patterns.
Supply-side Factors		
	Perceived Relationship Quality	A consumer's overall assessment of the strength of the relationship between the consumer and the supplier.
	Network Quality	Network Availability.

6.2.3. Use (Consumption) Stage

The consumption stage of the iMoMAM has initial use, compatibility, ease of use and relative advantage as inputs, satisfaction as the evaluation process and incorporation (continual use) as the output. Expectation-confirmation theory (ECT) postulates that satisfaction with a particular service is a primary motivation for its continuance use (Oliver, 1980). As indicated in chapter 3, the consumer decision-making literature also postulates that a consumer's continued purchase depends on a satisfaction, dissatisfaction evaluation. A consumer's initial usage of a mobile money

service leads to an evaluation of the service, referred to as satisfaction. In a seminal work of Bhattacherjee (2001), he concluded that satisfaction and perceived usefulness are strong predictors of consumers' intention to continue B2C services. Since then, there have been a strong support for the satisfaction construct as a key determinant of continual use in IS research (Liao, Chen, & Yen, 2007; Venkatesh & Goyal, 2010). The disconfirmation model proposes that satisfaction is a function of the level of disconfirmation or the degree to which expectations are not met (Brown & Lam, 2008). Moreover, a consumer compares the experience derived from the use to the expectation to determine the level of disconfirmation. Thus, high positive disconfirmation (i.e. experience exceeds expectation) has a positive influence on satisfaction (Bhattacherjee, 2001). According to the findings of the empirical studies conducted in Kenya, consumer's satisfaction is a function of expectation and performance while the expectation is determined by past experience.

The third fieldwork revealed that, although, consumers had certain difficulties with the current system (for example, the lost connectivity during the money transfer process), their satisfaction level was found to be high because of their past experience in performing similar tasks before mobile money. During the study, participants appeared to have drawn upon their traditional experience of domestic remittance and the inefficiencies of the cash society when constructing their expectancies for the mobile money services. Contrary to its definition in the extant literature (e.g. (J. Lu, Yu, Liu, & Yao, 2003), past experience in this case is in relation to the relative advantage of the innovation. For example, if the existing method of money transfer takes twelve hours, my expectation and subsequent disconfirmation will be determined by that past experience. Relative advantage is as defined, "the degree to which the innovation is perceived as being better than the practices it supersedes" (Rogers, 2003). Although a service may not be meeting a consumer's expectation, his or her assessment of its relative advantage through past experience with alternative services may influence the satisfaction and hence continual usage. Thus, relative advantage as a determinant of satisfaction encompasses the comparison between expectation and performance described in IT continuance models (e.g. Bathacherjee, 2001). This is in support of Brown and Lam (2008) findings that experience is the only determinant of satisfaction. However, the empirical studies, found perceived ease of use to be a major determinant of incorporation at the consumption stage of the iMoMAM process model.

Practically, a consumer's ability to incorporate a service or services into their daily practices requires their confidence and comfort ability in usage. As we observed during fieldwork 3, most participants were confident in using the mobile money and claimed that the ease of use is a main reason for their continual usage. As a value added service, consumers of mobile data services have some level of experience with the mobile phone before engaging on the value added service. Consumers' increased knowledge in the use of mobile phone for other applications like MP3 and radio gives them confidence to be able to use the mobile money services. Hence, perceived ease of use was found to have less influence as a determinant of behavioral intentions than as an antecedent to continual usage or incorporation through satisfaction. A third construct that influences the consumer's second evaluation of use (Satisfaction) was compatibility.

Rogers (1995) defined compatibility as "the degree to which an innovation is perceived to be consistent with the existing values of potential adopters". The consumer's lifestyle in terms of existing social practices of money will influence their satisfaction after the initial use of the mobile money services (Teo and Pok, 2003). For example, a consumer who has a lifestyle of receiving remittances periodically, and have to wait at the bus stop for hours before a "matatu" will bring the remittance will find mobile money to be useful but not necessarily compatible. If the waiting for the bus has become part of the consumer's existing social life and it is considered as a time to socialize, then although mobile money is useful it might not be compatible with existing values. Thus, Satisfaction, defined as the consumer's overall psychological state that reflects the evaluation of mobile money services after use is seen as a necessary evaluation of the services that lead to incorporation or continual use. However, this evaluation is influenced by relative advantage and ease of use and compatibility. The influence of relative advantage and compatibility on behavioral intentions, have long been established in the literature (Karahanna, 1999; Moore & Benbasat, 1991, 1996). Both Tornatzky & Klein (1982) and Moore and Benbasat (1991) found relative advantage, complexity and compatibility as the most consistent determinants of adoption. Again, in (L. Chen, 2008), compatibility was found to have the strongest influence on adoption. However, we have not come across the influence of these two constructs on either satisfaction or continual use in extant IS literature. Figure 6.2 is an illustration of the consumption stage constructs and their relationships.

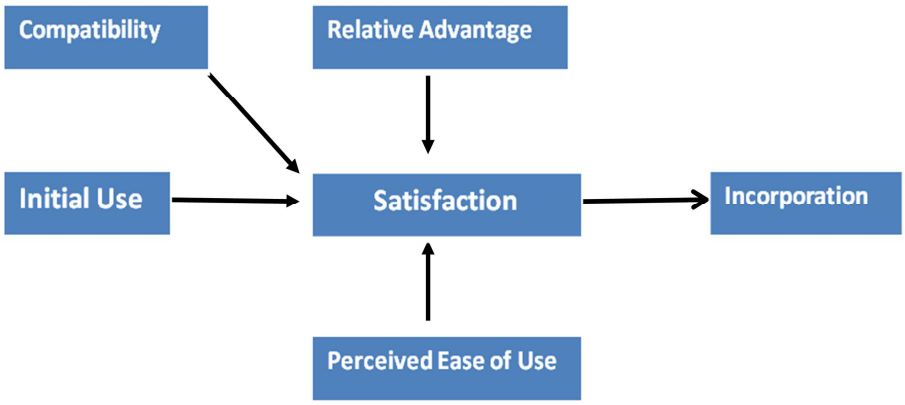


Figure 6.2 Consumption determinants

6.2.4. Adoption Stage

The adoption stage has incorporation, facilitating conditions and habit as the input, leading to the output of adoption. Rogers (1995) defines adoption as "a decision to make full use of an innovation as the best course of action available". The significance of this definition lies in the meaning of "full use" and "the best course of action available". Whiles it might seem that the definition implies adoption precedes use, critical interpretation points to use preceding a decision to make "full use of an innovation as the best course of action available". In the innovation decision process, the organization makes a decision to adopt, based on the acquisition of knowledge and the attractiveness of the innovation. Thus, knowledge and awareness are deemed influential enough for the organization to put together a decision to make full use of an innovation.

This may be different from an individual adoption decision-making process. For example, in going to conferences during my PhD journey, I came across much larger "Apple MacBook" users than I usually find in my everyday life. I became interested, and started gathering knowledge on what, how and why I should have an Apple MacBook. I discovered all the valid attributes of a MacBook and formed an intention to use. I purchased one from a local computer shop in Copenhagen, and immediately started using all the functionalities that attracted me to it, but I continued to use my existing Laptop (Microsoft platform, HP) alongside, because of existing data, applications and my on-hand familiarity with the windows environment. I used the MacBook, though partially for two weeks and reverted fully to my windows platform. Without claiming that all consumer adoption decision process goes through these steps, at least most will have the majority of the steps

described. By Rogers' definition, I did not adopt the MacBook at any point. I have no pre-adoption or post-adoption stages in the scenario described. On the other hand, it could be explained that I formed a behavioral intention to use from the social, technological and my individual characteristics, which led to an initial use and then an evaluation of use, which informed my rejection decision. Most importantly, not attending to the specificity in Rogers (2003) definition of adoption in the application of the innovation decision process had led to various conceptualizations of pre-adoption and post-adoption dependent variables (Karahanna & Straub, 1999; Thong, Hong, & Tam, 2006).

At the adoption stage, the consumer decides to make full use of the innovation as the best course of action available. At fieldwork 3, we observed consumers of mobile money (specifically, Safaricom's M-Pesa) who could be said to have adopted the services. The consumers see the use of M-PESA service as the best course of action available. When the network is down, they wait; when money is transferred wrongly to another recipient, they follow the procedures to retrieve their money and continue to use the service. Consumers change their social practices of money to suite the mobile money innovation. True adoption of an innovation could be said to have happened when a consumer confesses, "I do not know what I will do without mobile money". The empirical data from the transcripts and paper 6 shows that these consumers reached this stage post initial use and satisfaction phases. Although adoption goes hand in hand with continual use, adoption is a psychological state where the consumer has decided that the continual usage of the innovation is the best choice available. This psychological state is subject to a cyclical evaluation of continual use (Satisfaction) and its antecedents. Expectation and its corresponding relative advantage are subject to change as the consumer continues to use the service (Venkatesh et al., 2012). Furthermore, the adoption stage is influenced by the consumer's habit and facilitating conditions.

Habit has been shown in extant IS literature to predict actual behavior (Kim and Malhotra, 2005). Habit has been defined as, the extent to which people tend to perform a behavior automatically (Limayem, Hirt, & Cheung, 2007). Also, referred to as a behavior that is or has become automatic in a given situation and can be measured by the frequency of occurrence of that behavior (Landis, Triandis, & Adamopoulos, 1978). In a recent extension of UTAUT, Venkatesh et al. (2012) found habit to have a direct effect on use. Thus, referring to the definition of adoption by Rogers (1995);

for an innovation to be adopted by a consumer, some existing routinized habits, practices and usage situations will have to be changed. From the discussions held at Machakos chapel, it was obvious that the acceptance and continuous use of mobile money affects the consumers' social practices. One of the habits identified during the discussions was sporadic spending. Adopting the mobile money services meant that consumers had less cash on hand to buy sporadically. Therefore, the strength of a habit can affect a consumer's desire to make full use of an innovation as the best course of action available. Habit influences the consumers' adoption of new services. A consumer can form a behavioral intention to use, proceed to initial use and evaluate usage through satisfaction without adopting because of an impact of a habit. The strength of a habit has a negative influence on adoption. On the other hand, once the innovation becomes embedded in the consumer's way of life, he may also use it without consciously considering other alternatives of performing the behavior. As the best alternative available to the consumer, the innovation becomes the automatic choice of action. This aligns with Gefen (2004) finding, that habit explains about 40% of the variance in intention to use familiar technologies. Accordingly, habit has a dual effect on adoption.

The last construct identified in iMoMAM is facilitating conditions. Zhou, Lu, & Wang (2010) in integrating the technology task fit (TTF) with the UTAUT found facilitating conditions among three other constructs to have a significant effect towards user adoption. They found facilitating conditions to be similar to perceived behavioral controls under the TPB. From the consumer adoption perspective, facilitating condition echoes the resources, awareness and time owned by the consumer. The facilitating conditions in mobile money refer to the mobile telecommunication. This included variables such as support services from the mobile operator, network quality, availability of cheap handset, availability of agents, and the cost of the service. Two of the key determinants of successful implementation of mobile money identified in paper 2 are the development of the agent network and quality network (Jack and Suri, 2009). The availability of a good agent network and quality network coverage, will facilitate the consumer's decision to fully use the mobile money services as the best option available for performing financial transactions.

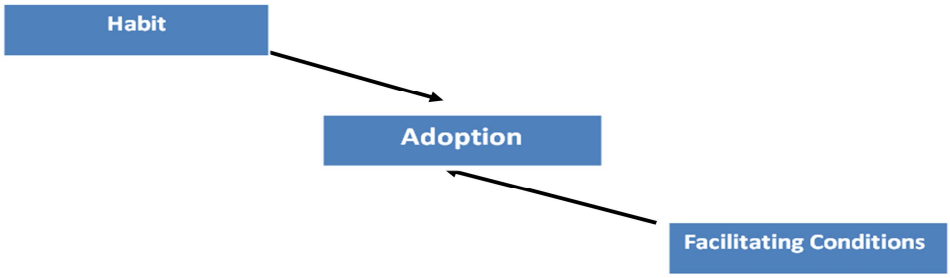


Figure 6.3 Adoption determinants

6.2.5. The Social and Personal Environment

The social environment of the interaction between the technologies and the consumer behavior affects the entire adoption process. From the empirical findings and the literature review, the social environmental factors of social practices, social networks, norms and values and the functional and symbolic meanings affect the entire consumer technology adoption process. On paper 6, we demonstrated how the introduction of mobile money in Kenya affected the social practices of money. In addition, how these practices in turn shaped the technology through consumption and further developments (m-Kesho).

Drawing from the domestication approach explained in chapter 3, the technology acceptance stage of iMoMAM could be said to be influenced by the functional and symbolic meanings of the consumer that are distinct from the designer's ideal user. In other words, the meanings that a consumer ascribes to an object or service influence his or her acceptance or rejection of the service. Furthermore, through the commodification moment, the development of the product or service is intrinsically connected with their future use context. The creation or translations of meanings, which arises as a result of the negotiations and readjustments of consumption is expressed through the conversion moment that then affects future developments and acceptance and use of the technology. This is what leads to the cyclical feature of the domestication approach.

The interviews and discussions in Kenya revealed the importance of social networks in the adoption process. Social networks referred to as sets of social structures, social position and social ties with various possible metrics (Licoppe & Smoreda, 2005). In information system literature social networks operationalized as social influence, have found some empirical support for its influence on technology acceptance (Lu et al. 2005; Karahanna and Straub, 1999; Venkatesh et al. 2003). Lu

et al. (2005) defines social influence as "perceived pressures from social networks to make or not to make a certain behavioral decision". Further a number of revisions of TAM suggest inclusion of a social influence construct (Venkatesh, 2000). Most of the female adopters in Machakos adopted because of their husbands in Nairobi who use the mobile money service to transfer funds to their families. Further, despite the extensive advertisement from Safaricom, the majority of the consumer's interviewed started using the services because of the influence of someone in their social networks.

An illiterate market woman at Machako's Market identified her friends as most instrumental in her adoption and continued usage of the mobile money services (see paper 6). Her consumption depends on the availability of one of her friends to do the transfer. Further, some depends on their children or other relations to use the service. It was observed that the consumption of the services leads to the breaking of some old ties and establishing new ones. The prominent role of the "matatu" driver in the traditional money transfer service moves to the mobile money agent. A good relationship with a local mobile money agent can afford you a credit facility for some days. Empirically, it was obvious that perceptions of the mobile money services were subjective and socially constructed and largely could be determined by the behavior of others. Thus, social networks were found to affect all stages of the integrated mobile money adoption model.

6.2.6. Rejection

The iMoMAM acknowledges rejection as a possible output of each of the stages in the adoption decision process. At any stage of the process, a consumer can decide to reject the mobile money innovation. One of the key criticisms of TAM and its family of social psychology theories (TRA and TPB) has been that they make an individual's character, behavior to be fixed, and robotic (Adam et al. 2004). Similar to the scenario outlined under adoption, a consumer does not have to automatically follow the stages of the iMoMAM.

6.2.7. The Structure of iMoMAM

- iMoMAM is synthesized from other models, mainly DoI, TAM, domestication approach Expectancy Confirmation Model (ECM) and consumer decision making process and thus the

correlations at the technology acceptance stage i.e. personal innovativeness, demographic factors, PU, PEoU, have been verified in the extant literature.

- It will be difficult to verify the iMoMAM quantitatively, because of the inclusion of certain qualitative concepts which may be difficult to quantitatively operationalize. Nevertheless, the bases of all the existing relationships in iMoMAM are at least two sources, which is either literature review, quantitative source and qualitative findings interpreted from a pragmatic philosophical stance.

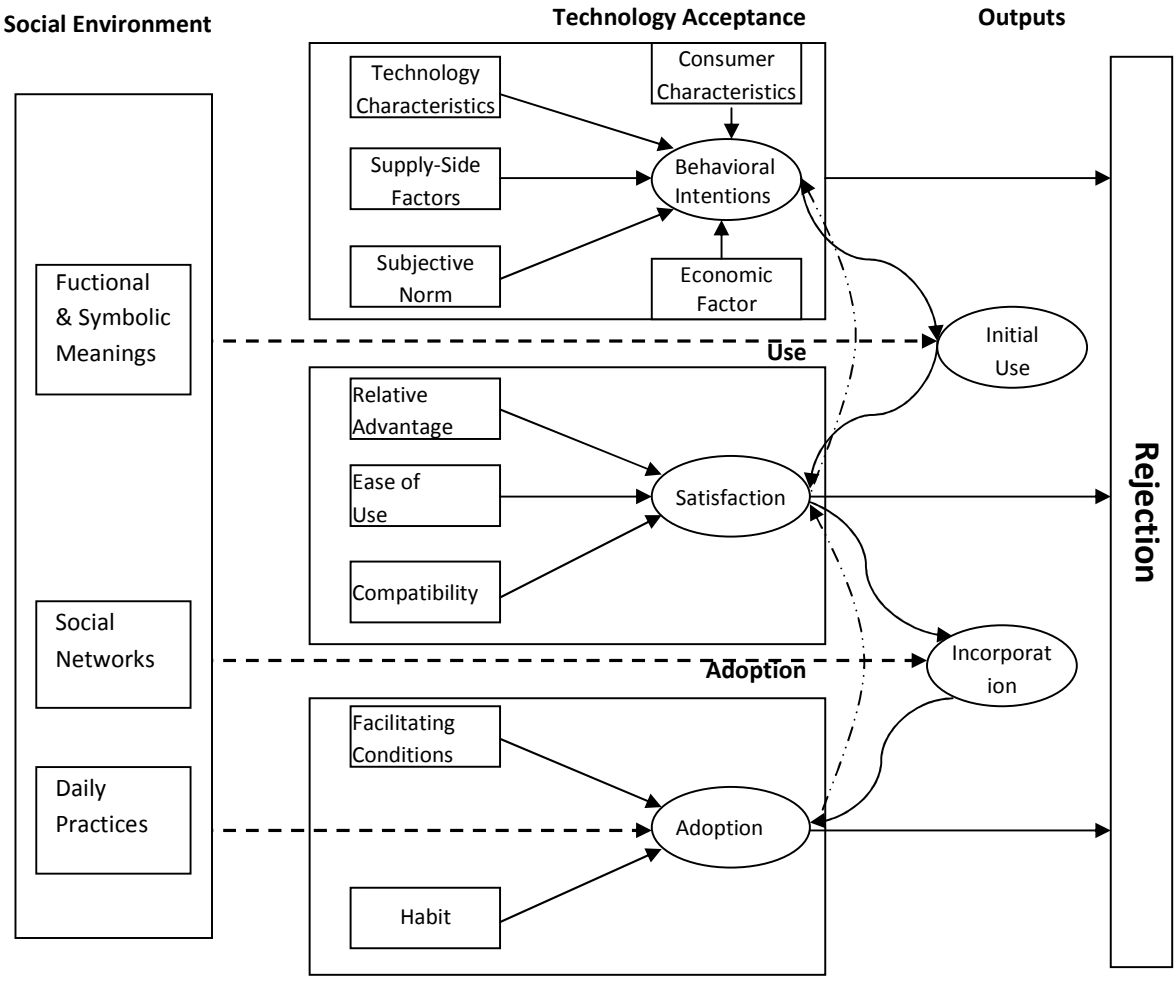


Figure 6.4 Integrated Mobile Money Adoption Model

The proposed iMoMAM has three stages with five phases in all. The stages are technology acceptance, use and adoption. More so, the phases are behavioral intentions, initial use, satisfaction, incorporation and conversion. iMoMAM posits that, an individual adoption of mobile

money services is a process which begins with technology acceptance through actual use of the service to adoption. This involves an initial evaluation of the attributes of the MDS to form a behavioral intention to use the service. The intention leads to initial use. After the initial use of MDS, the individual will evaluate his/her satisfaction of the service to decide continual usage or rejection of the service. A series of continual usage will lead to the individual having the services embedded in his/her everyday life, hence conversion. The embeddedness of the service in an individual's everyday life involves a series of satisfaction evaluations, which will shape the interactions between the individual and the MDS.

Table 6.2 iMoMAM phases definition

Phases	Definitions
Beliefs	
Behavioral Intentions	Behavioral Intentions are simply what individuals intend to do. Collectively, findings from most prior research suggest that an individual's intention to use a technology can sufficiently approximate or measure his or her actual use. This has led to a number of IS researches limiting findings to behavioral intentions and not actual use. However, in real life there could be certain intervening variables that will moderate the relationship between intention and actual use (Bagozzi 2007). For example, certain factors, such as availability may prevent a person who has formed an initial intention to use MDS from using it.
Initial Use	Initial Use, which is concerned with trying out the innovation on a limited basis. It is a resultant action from the behavioral intentions. A significant step towards evaluating the actual usefulness and user friendliness of the service.
Satisfaction	Is defined as an emotive response to service attributes and service information. It is argued to be the most immediate reaction to dimensions which include attributes and processes (Spreng et al. 1996). Satisfaction has been introduced in IS literature through the IT Continuation research and defined "as an evaluative "affect" resulting from end-users transactional experience with the product or services", which influences their decision to re-purchase (Bhattacherjee 2001). As a post consumption evaluation, satisfaction serves as a feedback function into future external searches and behavioral intention formation.
Incorporation	Continual usage of the mobile money service by an individual to the extent that it has become part of existing practice as a complement to or substitute for existing practice; involves the development of routines (Harwood, 2011). Silverstone et al. (1992) suggest that for an artifact to be incorporated it has to be actively used, such as in the performance of a task. The use of the artifact or service fits into consumer's time.
Conversion	Conversion involves "the various things consumers do to signal to others their participation in the consumption and innovation" (Silverstone and Haddon, 1996). It concerns the relationship between the individual and his/her outside world and depicts the effect of the technology of existing relationships and new relationships created by the embeddedness of technology in the individual's everyday life (Silverstone et al. 1992 p.25).

6.3. Construction of Meanings

Beyond the iMoMAM, this research contributes towards an understanding of the barriers to becoming banked by the rural unbanked. The biography of banking to the rural unbanked was found in Paper 4 as one of the key barriers to banking in general. The perceptions of banking built through history of some of the erstwhile banking customers among the rural folks served as a major disincentive to adopting any banking solution. Rather, they adopt a more social networking concept of ROSCA, 'susu' and 'mwenga in Kenya' which provides them some savings and credit facilities without the requirements of documentation, initial deposit and possible jail terms if loans are not repaid on time.

Aside the instrumentality of technology, the functional and symbolic meanings (developed from the societal biographies of objects, services and institutions) that the consumer has regarded the institutions of application can affect the intentions and the use of the service (Silverstone and Hirsch, 1994 pp.15). Practically, in the formation of the public meanings (formal economy), designers, producers and marketers need to understand the biographies of the institutions of application that the service or object represents in a given society. For example, as per the conclusions of paper 4, the rural unbanked interviewed in Ghana are more likely to accept the mobile money service as a 'susu' service rather than as a banking service. In cases where the object (as in mobile phones) is new to the society, the biographies of the institution (bank) of the application are more significant in the consumer's construction of both functional and symbolic meanings.

Further, the effect of a household's consumption, which leads to the construction or transformation of meanings on the wider society, depends on the culture of the society. In other words, the cyclical effect of the commodification moment on the domestication process discussed by Silverstone (2006) depends on the expressiveness of the society. The assimilation of the individual meanings formed or transformed during consumption in the commodification of the service by others is influenced by the expressiveness of the society. Thus, in certain cultures, a faster diffusion of the service could be obtained by actively seeking expressions of the consumer's new meanings of service and incorporating in the commodification moments as was in the case of M-PESA in Kenya (see Paper 6).

6.4. The Supply Side

Although, the fundamental objective of this study was to examine the demand-side factors that influences the development of mobile money services, it became very clear from observation and analysis of extant literature that the influence of the enabling environment (supply-side factors) on the individual's adoption decision cannot be overemphasized. In paper 3, we explored the effect of the various symbiotic relationships between the key actors of the mobile money ecosystem using M-PESA as a case study. Adapting the dimensions of symbiotic relationships from Fransman (2007), it was analyzed that the development of the mobile money services depends on the health of the relationships between its key actors. The most important relationship was found to be the relationship between the agent and the customer. Further, the MNO as a keystone player provides the enabling environment for the development of the services.

7. Conclusion and Further Studies

As I write the conclusion of this thesis, I reflect on my first PhD doctoral school during the ITS conference in Copenhagen. I remember when I presented my research for the first time; most participants were interested in the story of mobile money but had concerns about how I could make a theoretical contribution in a research area that is crowded with researchers from various disciplines. The applications of TAM, TPB and their diverse extensions have been so exhaustive that some editors have refused to read any manuscript with TAM in its keywords. New PhD students are advised to focus more on usage and impact studies rather than technology acceptance (Donner, 2008). Once I had to draw an editor's attention to the fact that I was criticizing not supporting TAM before he assigned an associate editor to my paper.

Starting from Kaharanna (1999) and then Bathacherjee (2001), the beliefs, intentions causality studies are shifting from the pre adoption stage to the post adoption stage where continual use and its intention are the dependent variables. It seems that we are at the boundaries of technology acceptance research and yet existing theories cannot fully explain why the same technology (mobile money) introduced by the same operator (MTN) in two countries with similar socioeconomic factors lead to different results. Perhaps, we are too quick to create, apply, extend, or modify theories that we miss the very detailed contextual information that fits the puzzle and adds to our understanding of how certain individuals in a given social context will appropriate a specific technology. Or perhaps the distinctive outlook of variance verses process approach to explaining human behavior with the dominance of the variance approach could account for the limited understanding of these concepts. Whilst I admit that certain aspects of human behavior could be conceived quantitatively, it has to be noted that not all aspects could be explained in a binary. On the other hand, perhaps, the complexities of human behavior in diverse social context and cultures coupled with the rapid increase in complexity of technologies mean that the understanding of the phenomena that arise from their interactions can only be in part (Lee, 2001). In whichever way, it is my hope that my pursuance of the research objectives outlined in chapter 1 and the introduction of the iMoMAM, which combines variance and process approaches contributes in extending human understanding of the phenomena.

The strength of this research lies in the diverse aspects of the consumer's adoption experience explored and the diversity of the data collection. Although, specific aspects of the findings and conclusions may not be novel, the novelty lies in their application in this specific context of mobile money services. In the mist of this diverse data collection and analysis, is an attempt to demonstrate how a newer form of technology is adopted within a context which is perhaps hostile to alternative solutions, which are taken for granted in the developed economies. By applying the technology acceptance model for this specific phenomenon of mobile money, my quest was not just to add to the existing chain of IS literature that has successfully confirmed the generalization of the TAM constructs in a mobile data services research arena and in the unique case of the rural unbanked. But to understand their extent of influence especially in a substitution instead of complementary environment. Through the further focus group discussions, it was discovered that though poor, the rural unbanked, can still acknowledge the instrumentality of the mobile money services and dare to use it. Consumption of technology can be best achieved if the instrumentality of the technology or its associated services can be demonstrated in the "public economy" through either design or policy. Sometimes our continued use of technology (with the extensive knowledge of its biographies) in our daily life could blur our consciousness of the significance of a rural folk's intention to use a technology so strange and so remote yet intimate as mobile money. It was therefore not extraordinary that in both the quantitative study and the focus group discussions, trust was considered very influential in accepting the technology.

Specifically, the introduction of iMoMAM as an integrated model aimed at refocusing our attention to technology adoption as a process. Moreover, that a process model does not necessarily require a longitudinal study to test or apply but can be explained by a series of cross-sectional studies with data collected from users in different stages of the process, even across geographical borders. The iMoMAM model is a valuable synthesis of concepts and contracts coming out of both variance based deductive research, descriptive research, and more in-depth qualitative research. I identify and distinguish between factors that strongly correlates with technology acceptance and use of existing IS literature adapting constructs that have been conceptualized and operationalized in extant literature, which integrates with qualitative factors focusing on the social network, daily practices and symbolic dynamics within the individual consumer context described in the

domestication research. As new technologies evolve, there will always be the need for acceptance studies since they precede use and adoption.

Finally, applying the domestication approach, one of the key contributions of this research was the introduction of the mobile money technology appropriation model in paper 6. The model posits that, the individual's appropriation of technology is determined by the public and private meanings of the technology and social influence. As explained earlier, the public meaning of technology is acquired from the technology characteristics whereas the private meanings are from the individual's daily practices and the technology characteristics as shown in figure 7.1 below:

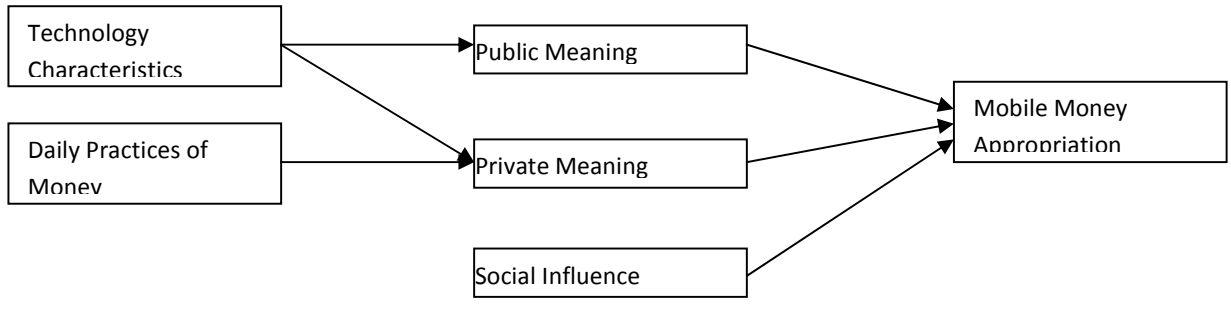


Figure 7.1: Mobile Money Technology Appropriation Model

7.1. Beyond Technology Adoption

As I ponder over the nature of IS field and the contributions of my research, I wandered over the words of Lee (2001, p. iii):

> Research in the information systems field examines more than just the technological system, or just the social system, or even the two side by side; in addition, it investigates the phenomena that emerge when the two interact.

Thus, the contribution of this study is not only in the introduction of the iMoMAM but also on the reporting of the contextual information on the emergence of the phenomenon of mobile money and its continuous impact on the social practices of its users. I hope that through the series of field works, I have been able to answer the research questions that guided this research. I have analyzed the key roles and structure of the mobile money services and the effect of various business models on the acceptance, use and adoption of the service applying the business ecosystem and the keystone concepts. Further, I have identified the key characteristics of an early adopter of the

technology. Like most mobile data services, early adopters were differentiated from late adopters through their psychometric and demographic differences. Consumer innovativeness and opinion leadership were identified as key determinants of early adopters of the mobile money services. Aside the usual instrumental constructs of Perceived Usefulness and Perceived Ease of Use (PEOU), Perceived Economic Factor and Trust were found to be most significant determinants of the acceptance of mobile money services. However, PEOU was found to be more significant in determining the actual use through satisfaction than the initial use through intentions. In addition, Relative Advantage was argued to be a better determinant of actual use than perceived usefulness.

7.2. Further Studies and Limitations

There are two particular areas of research that could help advance iMoMAM. A longitudinal research that will investigate users through their acceptance, use and adoption of a particular mobile money service. Further studies on the effect of the supply side factors on the acceptance, use and adoption of the mobile money services may be necessary. For example, to what extent did the symbiotic relationship between the regulator and the MNO affect the diffusion of the mobile money services within a particular social context. Further analysis of the demographic factors and usage of the services may increase our understanding of the diverse usage of the service. For example, what different ways are women using the services than men and how is the adoption of the mobile money services affecting the structures of the household. In the future, an attempt will be made to answer some of these questions from the existing data collected as part of this research.

At this point of development, our research has certain potential limitations. First, the consumption data were small and in a single environment. A larger number of consumers from different parts of Kenya could have revealed richer understanding and explanation of the social and cultural effect of technology acceptance and use. Similarly, and extension of the studies to include the urban users in Nairobi would have produced better explanation of the effect of social networks on consumption and eventual adoption of the service. In studying the factors that affect technology acceptance, data were collected from different aspects of the phenomenon, although useful, the mixture of data from the rural and urban consumers may have affected the results. Perhaps, in the future, a longitudinal study of a community's acceptance of this technology may be helpful. Secondarily, the

model could not be described as parsimonious. There is an increase call in IS literature for parsimonious models and framework as in Weber (2003). The number of constructs in the model may discourage its usage in the future. However, as explained earlier, parts of the iMoMAM model could be empirically tested separately.

8. References

Agarwal, R., & Prasad, J. (1998). A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information systems research*, *9*(2), 204–215.

Agarwal, R., & Prasad, J. (2000). A field study of the adoption of software process innovations by information systems professionals. *Engineering Management, IEEE Transactions on*, *47*(3), 295–308.

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, *50*(2), 179–211.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Aker, J. C. (2010). Information from markets near and far: Mobile phones and agricultural markets in Niger. *American Economic Journal: Applied Economics*, *2*(3), 46–59.

Aker, J., & Mbiti, I. (2010). Mobile phones and economic development in Africa. *Center for Global Development Working Paper*, (211). Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1693963

Alavi, M., & Joachimsthaler, E. A. (1992). Revisiting DSS implementation research: A meta-analysis of the literature and suggestions for researchers. *Mis Quarterly*, 95–116.

Alleman, J., & Rappoport, P. (2010). Mobile money: implications for emerging markets. *Communications and Strategies*, (79), 15–28.

Al-Natour, S., & Benbasat, I. (2009). The adoption and use of it artifacts: a new interaction-centric model for the study of user-artifact relationships. *Journal of the Association for Information Systems*, *10*(9), 661–685.

Alvesson, M., & Kärreman, D. (2007). CONSTRUCTING MYSTERY: EMPIRICAL MATTERS IN THEORY DEVELOPMENT. *Academy of Management Review*, *32*(4), 1265–1281.

Aune, M. (1996). The computer in everyday life: Patterns of domestication of a new technology. *Making technology our own*, 91–120.

Baert, P. (2005). *Philosophy of the social sciences: Towards pragmatism*. Cambridge: Polity Press.

Bagozzi, R. P. (2007). The Legacy of the Technology Acceptance Model and a Proposal for a Paradigm Shift. *Journal of the Association for Information Systems*, *8*(4), 3.

Bagozzi, R. P., & Fornell, C. (1982). Theoretical concepts, measurements, and meaning. *A second generation of multivariate analysis*, *2*, 24–38.

Bakardjieva, M. (2005). *Internet society: The Internet in everyday life*. Sage Publications Limited.

Bankable Frontier Associates. (2007). *FINANCIAL SERVICE ACCESS AND USAGE IN SOUTHERN AND EAST AFRICA: WHAT DO FINSCOPE SURVEYS TELL US?* Somerville, MA: Bankable Frontier Associates. Retrieved from http://www.finscope.co.za/documents/2007/CrossCountryreport.pdf

Bankable Frontier Associates. (2010). *South African Financial Diaries and the Mzansi Initiative: Five Years Later.* Midrand: FinMark Trust. Retrieved from http://bankablefrontier.com/wp-content/uploads/2012/09/BFA-Mzansi-Financial-Diaries-revisits-160210-FINAL1.pdf

Barnes, S. J., & Huff, S. L. (2003). Rising sun: iMode and the wireless Internet. *Communications of the ACM*, *46*(11), 78–84.

Bartels, J., & Reinders, M. J. (2011). Consumer innovativeness and its correlates: A propositional inventory for future research. *Journal of Business Research*, *64*(6), 601–609.

Beck, D., & Black, E. W. (2012). Communication is key: the role of communication in the diffusion of a learning management system into a higher education environment. *International Journal of Learning Technology*, *7*(1), 4–22.

Beck, T., Demirgü\cc-Kunt, A., & Peria, M. S. M. (2008). Banking services for everyone? Barriers to bank access and use around the world. *The World Bank Economic Review*, *22*(3), 397–430.

Beckett, A., Hewer, P., & Howcroft, B. (2000). An exposition of consumer behaviour in the financial services industry. *International Journal of Bank Marketing*, *18*(1), 15–26.

Berente, N., Gal, U., & Hansen, S. (2010). Ethical implications of social stratification in information systems research. *Information Systems Journal*, *21*(4), 357–382.

Berman, M. S. (2011). The Development, Use and Cultural Context of M-PESA in Costal Kenya.

Beshouri, C. P., & Gravr\aak, J. (2010). Capturing the promise of mobile banking in emerging markets. *McKinsey Quarterly*, *3*(8). Retrieved from http://osmangok.yasar.edu.tr/BUS%20482%20Marketing%20Financial%20Services/Mc%20Kinsey%20Articles%20for%20Term%20Project/Capturing%20the%20promise%20of%20mobile%20banking%20in%20emerging%20markets.pdf

Bhattacherjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS quarterly*, *25*(3), 351–370.

Bhattacherjee, A., Perols, J., & Sanford, C. (2008). Information technology continuance: a theoretic extension and empirical test. *Journal of Computer Information Systems*, *49*(1), 17–26.

Biomedical, N. C. for the P. of H. S. of, & (US), B. R. (1979). *The Belmont report: Ethical principles and guidelines for the protection of human subjects of research*. Department of Health, Education, and Welfare.

Blaike, N. (2009). *Designing social research*. Cambridge: Polity Press.

Blechar, J., Knutsen, L., & Damsgaard, J. (2005). Reflexivity, The social actor, and m-service domestication: Linking the human, technological, and contextual. *Designing ubiquitous information environments: Socio-technical issues and challenges*, 57–70.

Bohlin, E., Olsson, T., & Westlund, O. (2008). *Mobile barometer 2007 - An analysis of the Swedish mobile society*. Chalmers & Göteborgs University.

Bouwman, H., Carlsson, C., Molina-Castillo, F. J., & Walden, P. (2007). Barriers and drivers in the adoption of current and future mobile services in Finland. *Telematics and Informatics*, *24*(2), 145–160. doi:10.1016/j.tele.2006.08.001

Brown, S. P., & Lam, S. K. (2008). A meta-analysis of relationships linking employee satisfaction to customer responses. *Journal of Retailing*, *84*(3), 243–255.

Bruhn, M., & Love, I. (2009). The economic impact of banking the unbanked: evidence from Mexico. *World Bank Policy Research Working Paper Series, Vol*. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1428628

Bryman, A. (2004). Understanding research for social policy and practice themes, methods and approaches. *The Policy Press.*

Bryman, A., & Bell, E. (2007). *Business research methods*. Oxford University Press, USA.

Burgess, R., Pande, R., & Wong, G. (2005). Banking for the poor: Evidence from India. *Journal of the European Economic Association*, *3*(2-3), 268–278.

Burrell, G., & Morgan, G. (1979). *Social paradigms and organizational analysis: Elements of the sociology of corporate life. London: Heinemann Educational.* London: Heinemann Educational.

Burton-Jones, A., McLean, E. R., & Monod, E. (2011). *On approaches to building theories: Process, variance and systems*. Working paper, Sauder School of Business, UBC. Retrieved from https://www.business.uq.edu.au/sites/default/files/event/supportingDocs/Andrew%20Burton-Jones%20paper.pdf

Camnar, G., & Sjöblom, E. (2009). Can the success of M-PESA be repeated? – A review of the implementations in Kenya and Tanzania. Valauble Bits. Retrieved from http://www.valuablebits.com

Camner, G., Sjöblom, E., & Pulver, C. (2009). What Makes a Successful Mobile Money Implementation. *Learnings from M-PESA in Kenya and Tanzania*.

Campbell, S. W., & Russo, T. C. (2003). The cocial construction of mobile telephony: an application of the social influence model to perceptions and uses of mobile phones within personal communication networks. *Communication Monographs*, *70*(4), 317–334.

Carlsson, C., Carlsson, J., Hyvonen, K., Puhakainen, J., & Walden, P. (2006). Adoption of mobile devices/services—searching for answers with the UTAUT. *System Sciences, 2006. HICSS'06. Proceedings of the 39th Annual Hawaii International Conference on* (Vol. 6, p. 132a–132a). Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=1579556

Carlsson, S. A. (2005). Developing information systems design knowledge: a critical realist perspective. *The Electronic Journal of Business Research Methodology*, *3*(2), 93–102.

Carroll, J., Howard, S., Vetere, F., Peck, J., & Murphy, J. (2002). Just what do the youth of today want? Technology appropriation by young people. *System Sciences, 2002. HICSS. Proceedings of the 35th Annual Hawaii International Conference on* (pp. 1777–1785). Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=994089

Casanovas, I. (2010). Exploring the current theoretical background about adoption until institutionalization of online education in universities: needs for further research. *Electronic Journal of E-learning*, *8*(2), 73–84.

CCK. (2012). *Annual Report, Financial Year 2011*. Communications Commission of Kenya.

Chau, P. Y. K., & Hu, P. J. H. (2001). Information Technology Acceptance by Individual Professionals: A Model Comparison Approach*. *Decision Sciences*, *32*(4), 699–719.

Chen, L. (2008). A model of consumer acceptance of mobile payment. *International Journal of Mobile Communications*, *6*(1), 32–52.

Chen, W., & Hirschheim, R. (2004). A paradigmatic and methodological examination of information systems research from 1991 to 2001. *Information Systems Journal*, *14*(3), 197–235.

Cheong, J. H., & Park, M. C. (2005). Mobile internet acceptance in Korea. *Internet Research*, *15*(2), 125–140.

Chia, R. (2002). Philosophy and Research. *Essential Skills for Management Research.*

Chia, S. C., Li, H., Detenber, B., & Lee, W. (2006). Mining the internet plateau: an exploration of the adoption intention of non-users in Singapore. *New Media & Society*, *8*(4), 589–609.

Christians, C. G. (2005). Ethical theory in communications research. *Journalism Studies*, *6*(1), 3–14.

Clark, A. M. (2002). The qualitative-quantitative debate: moving from positivism and confrontation to post-positivism and reconciliation. *Journal of Advanced Nursing*, *27*(6), 1242–1249.

Collier, A. (1994). Critical Realism: An Introduction to Roy Bhaskar$\backslash$'s Philosophy. Retrieved from http://www.citeulike.org/group/718/article/2785938

Collins, D. (2009). *Portfolios of the poor: how the world's poor live on $2 a day*. Princeton University Press.

Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Thousand Oaks, CA: Sage.

Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. *Handbook of mixed methods in social and behavioral research*, 209–240.

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. Sage Publications Limited. Retrieved from http://books.google.com/books?hl=en&lr=&id=Op_SDKrf1ZQC&oi=fnd&pg=IA1&dq=Crotty+1998&ots=RrHAU6r-z-&sig=Qj6UAtx5LNO84rEeV9jzKasn0Go

Crowston, K. (2000). Process as theory in information systems research. *Proceedings of the IFIP TC8 WG8*, *2*, 149–163.

Dabholkar, P. A., & Bagozzi, R. P. (2002). An attitudinal model of technology-based self-service: moderating effects of consumer traits and situational factors. *Journal of the Academy of Marketing Science*, *30*(3), 184–201.

Dahlberg, T., Mallat, N., Ondrus, J., & Zmijewska, A. (2008). Past, present and future of mobile payments research: A literature review. *Electronic Commerce Research and Applications*, *7*(2), 165–181.

Datta, K., McIlwaine, C., Wills, J., Evans, Y., Herbert, J., & May, J. (2007). The new development finance or exploiting migrant labour?: Remittance sending among low-paid migrant workers in London. *International Development Planning Review*, *29*(1), 43–67.

Davies, R. ., & Dale. (1994). *Introduction. In I. A. Davies, Analysing Social and Political Change. A Casebook of Methods*. London: Sage Publications.

Davis, F. D. (1985). *A technology acceptance model for empirically testing new end-user information systems: Theory and results*. Massachusetts Institute of Technology, Sloan School of Management. Retrieved from http://en.scientificcommons.org/7894517

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319–340.

Davis, F. D. (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. Retrieved from http://deepblue.lib.umich.edu/handle/2027.42/30954

Davis, F. D., & Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: three experiments. *International Journal of Human-Computer Studies*, *45*(1), 19–45.

de Koker, L., & Jentzsch, N. (2012). Financial inclusion and financial integrity: aligned incentives? *Shadow 2011: The shadow economy, tax evasion and money laundering: Proceedings of the 2011 Shadow conference* (pp. 1–28). Retrieved from http://dro.deakin.edu.au/view/DU:30041719

Dearing, J. W. (2009). Applying diffusion of innovation theory to intervention development. *Research on social work practice*, *19*(5), 503–518.

Demirguc-Kunt, A., & Klapper, L. (2012). *Measuring Financial Inclusion The Global Findex Database* (Policy Research Working Paper No. 6025). World Bank.

Demombynes, G., & Thegeya, A. (2012). Kenya's mobile revolution and the promise of mobile savings. *World Bank Policy Research Working Paper*, (5988). Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2017401

Diniz, E. H., de Albuquerque, J. P., & Cernev, A. K. (2011). Mobile Money and Payment: a literature review based on academic and practitioner-oriented publications (2001-2011). *SIG GlobDev Fourth Annual Workshop*. Presented at the SIG GlobDev, Shanghai, China. Retrieved from http://www.globdev.notesmerge.com/files/Shanghai%20Proceedings/24%20REVISED%20Diniz%20Mobile_Money_and_Payment_Nov%2014%202011.pdf

Dolan, J. (2009). Accelerating the Development of Mobile Money Ecosystems. *Proceeding of MOBILE MONEY SUMMIT*. Retrieved from http://www.microfinancegateway.org/gm/document-1.9.50869/Mobile%20Money%20Summit%202009.pdf

Donner, J. (2009). Blurring livelihoods and lives: The social uses of mobile phones and socioeconomic development. *Innovations: Technology, Governance, Globalization*, *4*(1), 91–101.

Donner, J., & Tellez, C. A. (2008). Mobile banking and economic development: Linking adoption, impact, and use. *Asian Journal of Communication*, *18*(4), 318–332.

Donovan, K. (2012). Mobile Money for Financial Inclusion. *Information and Communications for Development 2012: Maximizing Mobile*, 61.

DONOVAN, K. P. (2012). Mobile Money, More Freedom? The Impact of M-PESA's Network Power on Development as Freedom. *International Journal of Communication*, *6*, 2647–2669.

Drass, K. A. (1982). Negotiation and the structure of discourse in medical consultation. *Sociology of health & illness*, *4*(3), 320–341.

Duan, Y., He, Q., Feng, W., Li, D., & Fu, Z. (2010). A study on e-learning take-up intention from an innovation adoption perspective: A case in China. *Computers & Education*, *55*(1), 237–246.

Dubois, A., & Gadde, L. . (2002). Systematic combining: an abductive approach to case research. *Journal of Business Research*, *55*(7), 553–560.

Duncombe, R. (2010). Using the Livelihoods Framework to Analyze ICT Applications for Poverty Reduction through Microenterprise, *3*(3), 81–100.

Duncombe, R., & Boateng, R. (2009). Mobile phones and financial services in developing countries: A review of concepts, methods, issues, evidence and future research directions. *Third World Quarterly*, *30*(7), 1237–1258.

Dutta, S., & Bilbao-Osorio, B. (2012). *The Global Information Technology Report 2012 Living in a Hyperconnected World*. Geneva: World Economic Forum and INSEAD. Retrieved from http://www3.weforum.org/docs/Global_IT_Report_2012.pdf

Engel, J. F., Kollat, D. T., & Blackwell, R. D. (1968). A model of consumer motivation and behavior. *Research in Consumer Behavior, Holt, Rinehart and Winston, Inc., New York, NY*, 3–20.

Engel, J.F, Blackwell, R.D, & Miniard, P.W. (2001). *Consumer Behavior* (8th ed.). Chicago: Dryden.

Erasmus, A. C., Boshoff, E., & Rousseau, G. G. (2010). Consumer decision-making models within the discipline of consumer science: a critical approach. *Journal of Family Ecology and Consumer Sciences/Tydskrif vir Gesinsekologie en Verbruikerswetenskappe*, *29*(1). Retrieved from http://www.ajol.info/index.php/jfecs/article/view/52799

Eriksson, P., & Kovalainen, A. (2008). *Qualitative methods in business research*. Sage Publications Limited.

Fay, B. (1996). General Laws and Explaining Human Behavior. *Readings in the Philosophy of Social Science* (pp. 91–110). Cambridge: Mit Press.

Fishbein, M., & Ajzen, I. (1975). *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*. Reading, MA.: Addison- Wesley.

Fransman, M. (2007). 2 The New ICT Ecosystem. Retrieved from http://www.newbooks-services.de/MediaFiles/Texts/5/9780521171205_Excerpt_001.pdf

Frempong, G. (2010). Ghana ICT Sector Performance Review. Retrieved from http://www.researchictafrica.net/publications/ICT_Sector_Performance_Reviews_2010/Vol%202%20Paper%208%20-%20Ghana%20ICT%20Sector%20Performance%20Review%202010.pdf

Gefen, D. (2004). TAM or Just Plain Habit. *Advanced Topics in End User Computing*, *3*, 1.

Gencer, M. (2011). The Mobile Money Movement: Catalyst to Jump-Start Emerging Markets. *Innovations: Technology, Governance, Globalization*, *6*(1), 101–117.

Geser, H. (2004). *Towards a sociological theory of the mobile phone*. Publica. Retrieved from http://books.google.com/books?hl=en&lr=&id=CWmwreAHvOcC&oi=fnd&pg=PA235&dq=Towards+a+sociological+theory+of+the+mobile+phone&ots=WgFFFVHwyp&sig=t2c1pKe9datI4-W9FsdDHaKD-bU

Gillwald, A. (2005). *Towards an African e-Index: Household and individual ICT access and usage across 10 African countries*. LINK Centre, Wits University, School of Public and Development Management.

Goldberg, L. S. (2009). Understanding banking sector globalization. *IMF Staff Papers*, *56*(1), 171–197.

Goldsmith, R. E., & Foxall, G. R. (2003). The measurement of innovativeness. *The international handbook on innovation*, 321–330.

Goldsmith, R. E., Freiden, J. B., & Eastman, J. K. (1995). The generality/specificity issue in consumer innovativeness research. *Technovation*, *15*(10), 601–612.

Green, N., Harper, R., Murtagh, G., & Cooper, G. (2001). Configuring the mobile user: sociological and industry views. *Personal and Ubiquitous computing*, *5*(2), 146–156.

Gregor, S. (2006). The nature of theory in information systems. *Mis Quarterly*, *30*(3), 611–642.

Grewal, D. S. (2008). *Network power: The social dynamics of globalization*. Yale University Press.

Guba, & Lincoln. (1994). Competing paradigms in qualitative research. *Handbook of Qualitative Research* (2nd ed., pp. 163–194).

Ha, Y., & Stoel, L. (2004). Internet apparel shopping behaviors: the influence of general innovativeness. *International Journal of Retail & Distribution Management*, *32*(8), 377–385.

Habib, L. (2005). Domestication of learning environments in an institution of Higher Education'. *33rd Congress of the Nordic Educational Research Association, A Nordic Dimension in Education and Research, Myth or Reality* (pp. 10–12).

Haddon, L. (1998). Il controllo della comunicazione. Imposizione di limiti all'uso del telefono'. *Telecomunicando in Europa, Franco Angeli, Milano*, 195–247.

Haddon, L. (2003). Domestication and mobile telephony. *Machines that become us: The social context of personal communication technology*, 43–56.

Haddon, L. (2004). *Information and communication technologies in everyday life: A concise introduction and research guide*. Berg Publishers.

Haddon, L. (2006). The contribution of domestication research to in-home computing and media consumption. *The Information Society*, *22*(4), 195–203.

Hartmann, M., Berker, T., Punie, Y., & Ward, K. (2005). *Domestication of media and technology*. Open University Press. Retrieved from http://www.lavoisier.fr/livre/notice.asp?id=O22WA3ARLX6OWK

Harwood, S. A. (2011). The domestication of online technologies by smaller businesses and the "busy day." *Information and Organization*, *21*(2), 84–106.

Hatch, M. ., & Cunliffe. (2006). *Organization theory: Modern, symbolic, and postmodern perspectives(second edition)* (2nd ed.). Oxford: Oxford University Press.

Heron, J. (1996). *Co-operative inquiry: Research into the human condition*. London: Sage.

Heron, J., & Reason, P. (1997). A participatory inquiry paradigm. *Qualitative Inquiry*, *3*(3), 274–294.

Hinson, R. E. (2011). Banking the poor: The role of mobiles. *Journal of Financial Services Marketing*, *15*(4), 320–333.

Hirsch, E. (1992). *The Long Term and Short Term of Domestic Consumption: An Etnographic Case Study. V R. Silverstone in E. Hirsch (ur): Consuming Technologies: Media and Information in Domestic space: 208–226*. London: Routledge.

Homer, P. (2008). Mobile data services usage-a methodological research approach. *Communications*, *1*. Retrieved from http://www.ibimapublishing.com/journals/CIBIMA/volume1/v1n14.pdf

Hong, S. J., & Tam, K. Y. (2006). Understanding the adoption of multipurpose information appliances: the case of mobile data services. *Information Systems Research*, *17*(2), 162–179.

Hong, S. J., Thong, J. Y. L., Moon, J. Y., & Tam, K. Y. (2008). Understanding the behavior of mobile data services consumers. *Information Systems Frontiers*, *10*(4), 431–445.

Howard, J. A., & Sheth, J. N. (1969). The theory of buyer behavior. Retrieved from http://www.jagsheth.net/docs/A%20Theory%20of%20Buyer%20Behavior2.pdf

Howcroft, B., Hewer, P., & Hamilton, R. (2003). Consumer decision-making styles and the purchase of financial services. *Service Industries Journal*, *23*(3), 63–81.

Hughes, N., & Lonie, S. (2007). M-PESA: mobile money for the "unbanked" turning cellphones into 24-hour tellers in Kenya. *Innovations: Technology, Governance, Globalization*, *2*(1-2), 63–81.

Hynes, D., & Richardson, H. J. (2009). What use is domestication theory to information systems research?

Hynes, D., & Rommes, E. (2006). Fitting the Internet into our lives: IT courses for disadvantaged users. *Domestication of media and technology*, 125–144.

Iansiti, M., & Levien, R. (2004). *The keystone advantage: what the new dynamics of business ecosystems mean for strategy, innovation, and sustainability*. Harvard Business Press. Retrieved from http://books.google.com/books?hl=en&lr=&id=T_2QFhjzGPAC&oi=fnd&pg=PP15&dq=Iansiti+and+Levien+&ots=Ufy6M6mQp8&sig=toAmC_0_-CwiZB7BLlPzJm2ZAL4

Im, S., Bayus, B. L., & Mason, C. H. (2003). An empirical study of innate consumer innovativeness, personal characteristics, and new-product adoption behavior. *Journal of the Academy of Marketing Science*, *31*(1), 61–73.

Initiative, D. O. (2001). *Creating a Development Dynamic: Final Report*. Digital Opportunity Initiative.

Ismail, T., & Masinge, K. (2011). Mobile banking: Innovation for the poor. *UNU-MERIT Working Paper Series*. Retrieved from http://www.ungs.edu.ar/globelics/wp-content/uploads/2011/12/ID-354-Tashmia-Khumbula-Inclusive-Innovation-Social-and-Regional-Perspectives.pdf

ITU. (2011a). *World Telecommunication/ICT indicators Database.* ITU. Retrieved from http://www.itu.int/ITU-D/ict/statistics

ITU. (2011b). THE ROLE OF ICT IN ADVANCING GROWTH IN LEAST DEVELOPED COUNTRIES TRENDS, CHALLENGES AND OPPORTUNITIES. International Telecommunication Union. Retrieved from http://www.itu.int/ITU-D/ldc/turkey/docs/The_Role_of_ICT_in_Advancing_Growth_in_LDCs_Trends_Challenges_and_Opportunities.pdf

Ivatury, G., & Pickens, M. (2006). *Mobile Phone Banking and Low-income Customers: Evidence for South Africa*. CGAP/Grupo del Banco Mundial.

Jack, W., & Suri, T. (2011). *Mobile money: the economics of M-PESA*. National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w16721

Jackson, J. D., Yi, M. Y., & Park, J. S. (2010). Effects of individual innovativeness on physician acceptance of information technology. *International Journal of Services and Standards*, *6*(1), 21–42.

Jarvenpaa, S. L., & Lang, K. R. (2005). Managing the paradoxes of mobile technology. *Information Systems Management*, *22*(4), 7–23.

Jasperson, J. S., Carter, P. E., & Zmud, R. W. (2005). A comprehensive conceptualization of post-adoptive behaviors associated with information technology enabled work systems. *Mis Quarterly*, *29*(3), 525–557.

Javier Ewing, Nicolas Chevrollier, Maryanna Quigless, Thomas Verghese, & Matthijs Leenderste. (2012, February). ICT Competitiveness in Africa. TNO Innovation for Life. Retrieved from http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/282822-1346223280837/ICTCompetitiveness_Fullreport.pdf

Jenkins, B. (2008). Developing mobile money ecosystems. *Washington, DC: International Finance Corporation and Harvard Kennedy School*. Retrieved from http://www.hks.harvard.edu/m-rcbg/CSRI/publications/report_30_MOBILEMONEY.pdf

Johns, G. (2006). The essential impact of context on organizational behavior. *Academy of Management Review*, *31*(2), 386–408.

Johnson, R. ., & Onwuegbuzie, A. . (2004). Mixed methods research: A research paradigm whose time has come. *educational Researcher*, *33*(7), 2–14.

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of mixed methods research*, *1*(2), 112–133.

Jung, J., Chan-Olmsted, S., Park, B., & Kim, Y. (2012). Factors affecting e-book reader awareness, interest, and intention to use. *new media & society*, *14*(2), 204–224.

Karahanna, E. (1999). c MIS-rterly. *MIS quarterly*, *23*(2), 183–213.

Karahanna, E., & Straub, D. W. (1999). The psychological origins of perceived usefulness and ease-of-use. *Information & Management*, *35*(4), 237–250.

Karaiskos, D. C., Kourouthanassis, P., Lantzouni, P., Giaglis, G. M., & Georgiadis, C. K. (2009). Understanding the adoption of mobile data services: differences among mobile portal and mobile internet users. *Mobile Business, 2009. ICMB 2009. Eighth International Conference on* (pp. 12–17). Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5169226

Karjaluoto, H., Karvonen, J., Kesti, M., Koivumäki, T., Manninen, M., Pakola, J., Ristola, A., et al. (2005). Factors affecting consumer choice of mobile phones: two studies from Finland. *Journal of Euromarketing*, *14*(3), 59–82.

Karnani, A. (2009). Romanticizing the poor. *Stanford Social Innovation Review*, *7*(1), 38–43.

Kaushik, P. D., & Singh, N. (2004). Information technology and broad-based development: Preliminary lessons from North India. *World Development*, *32*(4), 591–607.

Kim, C., Tao, W., Shin, N., & Kim, K. S. (2010). An empirical study of customers' perceptions of security and trust in e-payment systems. *Electronic Commerce Research and Applications*, *9*(1), 84–95.

Kim, G., Shin, B. S., & Lee, H. G. (2007). Understanding dynamics between initial trust and usage intentions of mobile banking. *Information Systems Journal*, *19*(3), 283–311.

Kim, K. K., Shin, H. K., & Kim, B. (2011). The role of psychological traits and social factors in using new mobile communication services. *Electronic Commerce Research and Applications*, *10*(4), 408–417. doi:10.1016/j.elerap.2010.11.004

Kim, S. S., & Malhotra, N. K. (2005). A longitudinal model of continued IS use: An integrative view of four mechanisms underlying postadoption phenomena. *Management Science*, *51*(5), 741–755.

Kourouthanassis, P. E., Georgiadis, C. K., Zamani, E., & Giaglis, G. M. (2010). Explaining the adoption of mobile internet applications. *Mobile Business and 2010 Ninth Global Mobility Roundtable (ICMB-GMR), 2010 Ninth International Conference on* (pp. 148–153). Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5494809

Kuhn, T. S. (1996). *The structure of scientific revolutions* (Vol. 2). University of Chicago press.

Kuic, V., & Simon, Y. (1992). *The Tradition of Natural Law: A Philosopher's Reflections*. Fordham University Press. Retrieved from http://books.google.com/books?hl=en&lr=&id=b2UkPsyqADcC&oi=fnd&pg=PR13&dq=positivist+ontology+simon&ots=-o4wRTP6xI&sig=4BTzzL55o4WQZAP1Bqmy60IMBd8

Kulviwat, S., Bruner, I. I., Gordon, C., Kumar, A., Nasco, S. A., & Clark, T. (2007). Toward a unified theory of consumer acceptance technology. *Psychology & Marketing*, *24*(12), 1059–1084.

Kumar, A., Tewari, A., Shroff, G., Chittamuru, D., Kam, M., & Canny, J. (2010). An exploratory study of unsupervised mobile learning in rural India. *Proceedings of the 28th international conference on Human factors in computing systems* (pp. 743–752). Retrieved from http://dl.acm.org/citation.cfm?id=1753435

Kumar, V., & Svensson, J. (2012). Proceedings of M4D 2012 28-29 February 2012 New Delhi, India.

Kwon, H. S., & Chidambaram, L. (2000). A test of the technology acceptance model: the case of cellular telephone adoption. *System Sciences, 2000. Proceedings of the 33rd Annual Hawaii International Conference on* (p. 7–pp). Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=926607

Landis, D., Triandis, H. C., & Adamopoulos, J. (1978). Habit and behavioral intentions as predictors of social behavior. *The Journal of Social Psychology*, *106*(2), 227–237.

Lee, A. S. (1991). Integrating positivist and interpretive approaches to organizational research. *Organization science*, *2*(4), 342–365.

Lee, A. S., & Baskerville, R. L. (2003). Generalizing generalizability in information systems research. *Information systems research*, *14*(3), 221–243.

Lee, M. C. (2009). Predicting and explaining the adoption of online trading: An empirical study in Taiwan. *Decision Support Systems*, *47*(2), 133–142.

Lee, Y., Kozar, K. A., & Larsen, K. R. T. (2003). The technology acceptance model: Past, present, and future. *The Communications of the Association for Information Systems*, *12*(1), 53.

Liao, C., Chen, J. L., & Yen, D. C. (2007). Theory of planning behavior (TPB) and customer satisfaction in the continued use of e-service: An integrated model. *Computers in Human Behavior*, *23*(6), 2804–2822.

Lichtenstein, D. R., Ridgway, N. M., & Netemeyer, R. G. (1993). Price perceptions and consumer shopping behavior: a field study. *Journal of Marketing Research*, 234–245.

Licoppe, C., & Smoreda, Z. (2005). Are social networks technologically embedded?: How networks are changing today with changes in communication technology. *Social Networks*, *27*(4), 317–335.

Lie, M., & Sørensen, K. H. (1996). *Making technology our own?: domesticating technology into everyday life*. Scandinavian University Press Oslo.

Limayem, M., Hirt, S. G., & Cheung, C. M. K. (2007). How habit limits the predictive power of intention: The case of information systems continuance. *Mis Quarterly*, *31*(4), 705–737.

Lincoln, Y. ., & Guba, E. . (2000). *The only generalization is: There is no generalization. Case study method*.

Lincoln, Y. S., & Guba, E. E. (2005). Research, evaluation, and policy analysis: Heuristics for disciplined inquiry. *Review of Policy Research*, *5*(3), 546–565.

Ling, R. (2002). The diffusion of mobile telephony among Norwegian teens: A report from after the revolution. *Annals of Telecommunications*, *57*(3), 210–224.

Ling, R. (2008). Should we be concerned that the elderly don't text? *The Information Society*, *24*(5), 334–341.

Ling, R. S. (2004). *The mobile connection: The cell phone's impact on society*. Morgan Kaufmann Pub.

Ling, R., & Thrane, K. (2002). I don't watch TV to like learn anything. *First Monday*, *7*(1-7).

Lu, H. P., Hsu, C. L., & Hsu, H. Y. (2005). An empirical study of the effect of perceived risk upon intention to use online applications. *Information Management & Computer Security*, *13*(2), 106–120.

Lu, J., Liu, C., Yu, C. S., & Wang, K. (2008). Determinants of accepting wireless mobile data services in China. *Information & Management*, *45*(1), 52–64.

Lu, J., Yu, C. S., Liu, C., & Yao, J. E. (2003). Technology acceptance model for wireless internet. *Internet Research*, *13*(3), 206–222.

Luarn, P., & Lin, H.-H. (2005). Toward an understanding of the behavioral intention to use mobile banking. *Computers in Human Behavior*, *21*(6), 873–891. doi:10.1016/j.chb.2004.03.003

Lyons, A. C., & Scherpf, E. (2004). Moving from unbanked to banked: evidence from the Money Smart program. *FINANCIAL SERVICES REVIEW-GREENWICH-*, *13*(3), 215–232.

Mallat, N. (2007). Exploring consumer adoption of mobile payments – A qualitative study. *The Journal of Strategic Information Systems*, *16*(4), 413–432. doi:10.1016/j.jsis.2007.08.001

Manning, K. C., Bearden, W. O., & Madden, T. J. (1995). Consumer innovativeness and the adoption process. *Journal of Consumer Psychology*, *4*(4), 329–345.

Markus, M. L., & Robey, D. (1988). Information technology and organizational change: causal structure in theory and research. *Management science*, *34*(5), 583–598.

Mas, I., & Morawczynski, O. (2009). Designing mobile money services lessons from M-PESA. *Innovations: Technology, Governance, Globalization*, *4*(2), 77–91.

Mas, I., & Radcliffe, D. (2010). Mobile payments go viral: M-PESA in Kenya. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1593388

Mathieson, K. (1991). Predicting user intentions: comparing the technology acceptance model with the theory of planned behavior. *Information systems research*, *2*(3), 173–191.

Mathieson, K., Peacock, E., & Chin, W. W. (2001). Extending the technology acceptance model: the influence of perceived user resources. *ACM SIGMIS Database*, *32*(3), 86–112.

Maurer, B. (2012). Mobile money: Communication, consumption and change in the payments space. *Journal of Development Studies*, *48*(5), 589–604.

Maxcy, S. J. (2003). Pragmatic threads in mixed methods research in the social sciences: The search for multiple modes of inquiry and the end of the philosophy of formalism. *Handbook of mixed methods in social and behavioral research*, 51–89.

Maxwell, J. (2004). Understanding Validity in Qualitative Research. *Harvard Educational Review*, *62*(3), 279–299.

Maxwell, J. A. (1992). Understanding and validity in qualitative research. *Harvard educational review*, *62*(3), 279–301.

Maynard, M. (1994). *Methods, practice and epistemology: the debate about feminism and research. Researching women's lives from a feminist perspective*. London: Taylor and Francis Ltd.

Mbiti, I., & Weil, D. N. (2011). *Mobile banking: The impact of M-PESA in Kenya*. National Bureau of Economic Research.

McKay, C., & Pickens, M. (2010). Branchless Banking 2010: Who's Served? At What Price? What's Next? *Focus Note*, *66*. Retrieved from http://www.cgap.org/gm/document-1.9.47614/FN66_Rev1.pdf

McKechnie, S. (1992). Consumer buying behaviour in financial services: an overview. *International Journal of Bank Marketing*, *10*(5), 5–39.

Medhi, I., Gautama, S. N., & Toyama, K. (2009). A comparison of mobile money-transfer UIs for non-literate and semi-literate users. *Proceedings of the 27th international conference on Human factors in computing systems* (pp. 1741–1750). Retrieved from http://dl.acm.org/citation.cfm?id=1518701.1518970

Medhi, I., Ratan, A., & Toyama, K. (2009). Mobile-banking adoption and usage by low-literate, low-income users in the developing world. *Internationalization, Design and Global Development*, 485–494.

Merritt, C. (2011). Mobile money transfer services: The next phase in the evolution of person-to-person payments. *Journal of Payments Strategy & Systems*, *5*(2), 143–160.

Mertens, D. . (2009). *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods*. Sage.

Meuter, M. L., Bitner, M. J., Ostrom, A. L., & Brown, S. W. (2005). Choosing among alternative service delivery modes: An investigation of customer trial of self-service technologies. *Journal of Marketing*, 61–83.

Mingers, J. (2001). Combining IS research methods: towards a pluralist methodology. *Information Systems Research*, *12*(3), 240–259.

MMU. (2012). *Mobile Money Deployment*. GSM. Retrieved from http://www.mobileworldlive.com/mobile-money-tracker

Mohr, L. (1982). *Explaining Organizational Behavior*. San Francisco: Jossey-Bass.

Moon, J. W., & Kim, Y. G. (2001). Extending the TAM for a World-Wide-Web context. *Information & Management*, *38*(4), 217–230.

Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information systems research*, *2*(3), 192–222.

Moore, G. C., & Benbasat, I. (1996). Integrating diffusion of innovations and theory of reasoned action models to predict utilization of information technology by end-users. *Diffusion and adoption of information technology*, 132–146.

Morawczynski, O. (2011). Examining the adoption, usage and outcomes of mobile money services: the case of M-PESA in Kenya.

Morawczynski, O., & Pickens, M. (2009). Poor people using mobile financial services: observations on customer usage and impact from M-PESA.

Mortimore, M. (2008). Links between ecosystem services and poverty reduction: situation analysis for arid and semi-arid lands in Eastern Africa.

Murton, J. (1999). Population growth and poverty in Machakos District, Kenya. *Geographical Journal*, 37–46.

Muwanguzi, S., & Musambira, G. W. (2009). The Transformation of East Africa's Economy Using Mobile Phone Money Transfer Services A Comparative Analysis of Kenya and Uganda's Experiences. *Journal of Creative Communications*, *4*(2), 131–146.

Nicosia, F. M. (1966). CONSUMER DECISION PROCESSES; MARKETING AND ADVERTISING IMPLICATIONS. Retrieved from http://trid.trb.org/view.aspx?id=545607

Nysveen, H., Pedersen, P. E., & Thorbjørnsen, H. (2005a). Intentions to use mobile services: antecedents and cross-service comparisons. *Journal of the Academy of Marketing Science*, *33*(3), 330–346.

Nysveen, H., Pedersen, P. E., & Thorbjørnsen, H. (2005b). Explaining intention to use mobile chat services: moderating effects of gender. *Journal of Consumer Marketing*, *22*(5), 247–256.

Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of marketing research*, 460–469.

Oliver, R. L., & Westbrook, R. A. (1993). Profiles of consumer emotions and satisfaction in ownership and usage. *emotion*, *6*, 13.

Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organizations: Research approaches and assumptions. *Information systems research*, *2*(1), 1–28.

Orlikowski, W. J., & Iacono, C. S. (2000). The truth is not out there: An enacted view of the" digital economy. *Understanding the digital economy: Data, tools, and research*, 352–80.

Paré, G., Bourdeau, S., Marsan, J., Nach, H., & Shuraida, S. (2008). Re-examining the causal structure of information technology impact research. *European Journal of Information Systems*, *17*(4), 403–416.

Parthasarathy, M., & Bhattacherjee, A. (1998). Understanding post-adoption behavior in the context of online services. *Information Systems Research*, *9*(4), 362–379.

Pather, S., & Remenyi, D. (2004). Some of the philosophical issues underpinning research in information systems: from positivism to critical realism. *IT research in developing countries* (pp. 141–146). Presented at the the 2004 annual research conference of the South African institute of computer scientists and information technologists, Johanessburg:: South African Institute for Computer Scientists and Information Technologists.

Pedersen, P. E. (2005). Adoption of mobile Internet services: An exploratory study of mobile commerce early adopters. *Journal of organizational computing and electronic commerce*, *15*(3), 203–222.

Pedersen, P. E., Methlie, L. B., & Thorbjornsen, H. (2002). Understanding mobile commerce end-user adoption: a triangulation perspective and suggestions for an exploratory service evaluation framework. *System Sciences, 2002. HICSS. Proceedings of the 35th Annual Hawaii International Conference on* (p. 8–pp). Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=994011

Pedersen, P. E., & Nysveen, H. (2002). Using the theory of planned behavior to explain teenagers' adoption of text messaging services. *Agder University College*. Retrieved from http://mdfoo.s3.amazonaws.com/brijsingh/175547709709bb988bf8259830528e25/10.1.1.20.2242.pdf

Phillips, L. A., Calantone, R., & Lee, M. T. (1994). International technology adoption: Behavior structure, demand certainty and culture. *Journal of Business & Industrial Marketing*, *9*(2), 16–28.

Pierson, J. (2005). Domestication at work in small businesses. *Domestication of media and technology*, 205–226.

Porteous, D. (2006). The enabling environment for mobile banking in Africa. *London: DFID*. Retrieved from http://www.cab.org.in/ICTPortal/Lists/Knowledge%20Bank/Attachments/14/Enabling%20Environment%20for%20M-banking%20-%20Porteous_16_12_200749.pdf

Prahalad, C. K. (2010). *The fortune at the bottom of the pyramid: Eradicating poverty through profits*. Wharton.

Proctor, E., Silmere, H., Raghavan, R., Hovmand, P., Aarons, G., Bunger, A., Griffey, R., et al. (2011). Outcomes for implementation research: Conceptual distinctions, measurement challenges, and research agenda. *Administration and Policy in Mental Health and Mental Health Services Research*, *38*(2), 65–76.

Quandt, T., & von Pape, T. (2010). Living in the Mediatope: A Multimethod Study on the Evolution of Media Technologies in the Domestic Environment. *The Information Society*, *26*(5), 330–345.

Renaud, K., & Van Biljon, J. (2008). Predicting technology acceptance and adoption by the elderly: a qualitative study. *Proceedings of the 2008 annual research conference of the South African Institute of Computer Scientists and Information Technologists on IT research in developing countries: riding the wave of technology* (pp. 210–219). Retrieved from http://dl.acm.org/citation.cfm?id=1456684

Robey, D., & Boudreau, M. C. (1999). Accounting for the contradictory organizational consequences of information technology: Theoretical directions and methodological implications. *Information systems research*, *10*(2), 167–185.

Rogers, E. (1995). *The diffusion of innovations* (3rd ed.). New York: The Free Press.

Rutherford, S. (2001). *The Poor and Their Money, DFID*. New Dehli: Oxford India Paperbacks, Oxford University Press.

Samarajiva, R. (2005). Policy Commentary Mobilizing information and communications technologies for effective disaster warning: lessons from the 2004 tsunami. *New Media & Society*, *7*(6), 731–747.

Sarker, S., & Wells, J. D. (2003). Understanding mobile handheld device use and adoption. *Communications of the ACM*, *46*(12), 35–40.

Sathye, M. (1999). Adoption of Internet banking by Australian consumers: an empirical investigation. *International Journal of bank marketing*, *17*(7), 324–334.

Saunders, M., Lewis, P., & Thornhill, A. (2007). *Research methods for business students.* (4th ed.). London: Prentice-Hall.

Saunders, R. J., Warford, J. J., Wellenius, B., & Bank, W. (1983). *Telecommunications and economic development*. World Bank Washington, DC.

Schwandt, T. . (2000). Three epistemological stances for qualitative inquiry: Interpretivism, hermeneutics, and social constructionism. *Handbook of qualitative research* (pp. 189–213). Thousand Oaks, CA: Sage.

Sey, A. (2008a). Public access to ICTs: A review of the literature. *Center for Information & Society, University of Washington*. Retrieved from http://www.share4dev.net/telecentreskb/documents/4597.PDF

Sey, A. (2008b). *Mobile communication and development: a study of mobile phone appropriation in Ghana*. University of Southern California. Retrieved from http://digitallibrary.usc.edu/assetserver/controller/item/usctheses-m1318/etd-Sey-20080707.pdf

Sey, A. (2010). Managing the cost of mobile communications in Ghana. *Communication Technologies in Latin America and Africa*, 143–166.

Shin, D. H. (2009). Towards an understanding of the consumer acceptance of mobile wallet. *Computers in Human Behavior*, *25*(6), 1343–1354.

Shin, M. (2012). Secure Remote Health Monitoring with Unreliable Mobile Devices. *Journal of Biomedicine and Biotechnology*, *2012*. Retrieved from http://www.hindawi.com/journals/jbb/2012/546021/abs/

Silverstone, R. (1994). *Television and everyday life*. Routledge.

Silverstone, R. (2005). *Media, technology, and everyday life in Europe: From information to communication*. Ashgate Pub Limited. Retrieved from http://www.google.com/books?hl=en&lr=&id=dZRh3BKwFzIC&oi=fnd&pg=PR7&dq=domestication+silverstone&ots=kXEywPwlFW&sig=bs1nPUfajn3VkWpEI3brHgFjO84

Silverstone, R. (2006). *Domesticating domestication: Reflections on the life of a concept*. Open University Press. Retrieved from http://eprints.lse.ac.uk/id/eprint/9526

Silverstone, R. (n.d.). Eric Hirsch, eds. 1992. *Consuming technologies: Media and information in domestic spaces*.

Silverstone, R., & Hadden, J. (1996). Design and domestication. *Communication by Design (MANSELL R and SILVERSTONE R, Eds) Oxford University Press, Oxford*.

Silverstone, R., Haddon, L., In Silverstone, R., & Mansell, R. (1996). Design and the domestication of ICTs: technical change and everyday life. *Communicating by Design: The Politics of Information and Communication Technologies. Oxford: Oxford University Press. p44–74*. Retrieved from http://webfirstlive.lse.ac.uk/media@lse/WhosWho/AcademicStaff/LeslieHaddon/DesignandDomestication.pdf

Silverstone, R., & Hirsch, E. (1992). *Consuming technologies: media and information in domestic space Routledge*. London.

Silverstone, R., & Hirsch, E. (n.d.). *Consuming technologies: media and information in domestic spaces. 1992*. London: Routledge. xiv, 241p.

Slater, D., & Kwami, J. (2005). Embeddedness and escape: Internet and mobile use as poverty reduction strategies in Ghana. *Information Society Research Group (ISRG) report*. Retrieved from http://www.civilsociety.developmentgateway.org/uploads/media/civilsociety/internet.pdf

Smith, M. D., & Brynjolfsson, E. (2001). Consumer decision-making at an Internet shopbot: Brand still matters. *The Journal of Industrial Economics*, *49*(4), 541–558.

Steenkamp, J. B. E. M., Hofstede, F., & Wedel, M. (1999). A cross-national investigation into the individual and national cultural antecedents of consumer innovativeness. *The Journal of Marketing*, 55–69.

Sutherland, E. (2009). Counting mobile phones, SIM cards & customers. *Sim Cards & Customers (September 5, 2009)*. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1468847

Sweeney, J. C., & Soutar, G. N. (2001). Consumer perceived value: The development of a multiple item scale. *Journal of retailing*, *77*(2), 203–220.

Tadajewski, M. (2006). Anthropology and consumer research: qualitative insights into green consumer behavior. Qualitative market research. *An international journal*, *9*(1), 8–25.

Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches (Vol. 46)* (Vol. 46). California: Sage Publications Incorporated.

Taylor, S., & Todd, P. (1995). Decomposition and crossover effects in the theory of planned behavior: A study of consumer adoption intentions. *International journal of research in marketing*, *12*(2), 137–155.

Tellis, G. J., Prabhu, J. C., & Chandy, R. K. (2009). Radical innovation across nations: The preeminence of corporate culture. *Journal of Marketing*, *73*(1), 3–23.

Teo, T. S. H., & Pok, S. H. (2003). Adoption of WAP-enabled mobile phones among Internet users. *Omega*, *31*(6), 483–498.

Thompson, A. M., Brown, J. C., Kay, J. W., & Titterington, D. M. (1991). A study of methods of choosing the smoothing parameter in image restoration by regularization. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *13*(4), 326–339.

Thong, J. Y. L., Hong, S. J., & Tam, K. Y. (2006). The effects of post-adoption beliefs on the expectation-confirmation model for information technology continuance. *International Journal of Human-Computer Studies*, *64*(9), 799–810.

Tobbin, P. (2010). Modeling Adoption of Mobile Money Transfer: A Consumer Behaviour Analysis. *Proceedings of the 2nd International conference on M4D Mobile Communication Technology for*

Development M4D 2010 (pp. 280–293). Presented at the Mobile for Development, Karlstads universitet.

Tornatzky, L. G., & Klein, K. J. (1982). Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on engineering management*, *29*(1), 28–45.

Treatman, D., & Lesh, N. (2012). Strengthening Community Health Systems with Localized Multimedia. *Proceedings of M4D 2012 28-29 February 2012 New Delhi, India*, *28*(29), 7.

Tse, D. K., & Wilton, P. C. (1988). Models of consumer satisfaction formation: an extension. *Journal of marketing research*, 204–212.

Turel, O., Serenko, A., & Bontis, N. (2007). User acceptance of wireless short messaging services: Deconstructing perceived value. *Information & Management*, *44*(1), 63–73.

Van den Bulte, C. (2000). New product diffusion acceleration: Measurement and analysis. *Marketing Science*, *19*(4), 366–380.

Varshney, U. (2009). *Pervasive healthcare computing: EMR/EHR, wireless and health monitoring*. Springer. Retrieved from http://books.google.com/books?hl=en&lr=&id=f5NoQDpVy8oC&oi=fnd&pg=PA1&dq=%22varshney+2007+health+mobile+&ots=3ftz_FZiBI&sig=LOQXP8YB6NRacJMcfYFI15LSORQ

Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information systems research*, *11*(4), 342–365.

Venkatesh, V. (2006). Where To Go From Here? Thoughts on Future Directions for Research on Individual-Level Technology Adoption with a Focus on Decision Making*. *Decision Sciences*, *37*(4), 497–518.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management science*, *46*(2), 186–204.

Venkatesh, V., & Goyal, S. (2010). Expectation disconfirmation and technology adoption: Polynomial modeling and response surface analysis. *MIS Quarterly*, *34*(2), 281.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425–478.

Venkatesh, V., Thong, J., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIs Quarterly*, *36*(1), 157–178.

Vuojärvi, H., Isomäki, H., & Hynes, D. (2010). Domestication of a laptop on a wireless university campus: A case study. *Australasian Journal of Educational Technology*, *26*(2), 250–267.

Walsham, G. (1995). Interpretive case studies in IS research: nature and method. *European Journal of Information Systems*, *4*(2), 74–81.

Walsham, G. (2006). . Doing interpretive research. *European Journal of Information Systems*, *15*(3), 320–330.

Ward, K. (2006). The bald guy just ate an orange: Domestication, work and home. *Domestication of media and technologies*, 107–123.

Weber, R. (2003). Editor's comment: still desperately seeking the IT artifact. *Mis Quarterly*, *27*(2), iii–xi.

Webster, J., & Watson, R. T. (2002). ANALYZING THE PAST TO PREPARE. Retrieved from http://www.misq.org/misq/downloads/issue/id/103/

Wei, R. (2001). From luxury to utility: a longitudinal analysis of cell phone laggards. *Journalism & Mass Communication Quarterly*, *78*(4), 702–719.

Wellman, B. (2001). The persistence and transformation of community: from neighbourhood groups to social networks. *Report to the Law Commission of Canada*.

Westlund, O. (2008). From mobile phone to mobile device: News consumption on the go. *Canadian Journal of Communication*, *33*(3). Retrieved from http://cjc-online.ca/index.php/journal/article/viewArticle/2004

Willis, J. . (2007). *Foundations of qualitative research: Interpretive and critical approaches.* Sage Publications Incorporated.

Wilson, K., & Harper, M. (2010). *Financial Promise for the Poor: How Groups Build Microsavings*. Kumarian Pr.

Wixom, B. H., & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information systems research*, *16*(1), 85–102.

Yang, S., & KURNIA, S. (2009). Social Capital in Information and Communications Technology Research: Past, Present and Future. *Communications of the Association for Information Systems*, *25*(1), 1–40.

Yang, S., Lu, Y., Gupta, S., Cao, Y., & Zhang, R. (2011). Mobile payment services adoption across time: An empirical study of the effects of behavioral beliefs, social influences, and personal traits. *Computers in Human Behavior*. Retrieved from http://www.sciencedirect.com/science/article/pii/S0747563211001749

Yi, M. Y., Fiedler, K. D., & Park, J. S. (2006). Understanding the Role of Individual Innovativeness in the Acceptance of IT-Based Innovations: Comparative Analyses of Models and Measures*. *Decision Sciences*, *37*(3), 393–426.

Zhou, T., Lu, Y., & Wang, B. (2010). Integrating TTF and UTAUT to explain mobile banking user adoption. *Computers in Human Behavior*, *26*(4), 760–767. doi:10.1016/j.chb.2010.01.013

Evaluating the Adoption and Use of Mobile Data Services:

A Consumer Behavior Analysis

9. Part II - Selected Papers

Table of Contents

Modeling Adoption of Mobile Money Transfer: A Consumer Behaviour Analysis

Modeling Adoption of Mobile Money Transfer: A Consumer Behaviour Analysis. ***Proceedings of the 2nd International conference on M4D Mobile Communication Technology for Development M4D 2010*** **(pp. 280–293). Kampala, Uganda - 2010**

Abstract: The introduction of prepaid cards and the fallen prices of mobile handsets have lead to a rapid spread of mobile phones in the emerging economies. This has opened up diverse opportunities for them to be used over and above voice communication. One of such uses which have emerged lately is the use of mobile phones in financial services. This paper explored the key factors that affect the Ghanaian consumer's acceptance and use of mobile money transfer by extending using key determinants from TAM and DoI theory. We analysed the data using a Structural Equation Modeling (SEM) to evaluate the strength of the relationship between the constructs. The results were in support of the key TAM and DoI constructs.

Keywords: TAM, Adoption, Mobile Money, Mobile Money Transfer, Ghana, M-PESA, Diffusion of Innovation.

1. Introduction

With an increased, widespread use of mobile phones by consumers in the emerging markets, mobile money transfer is not just a fad but a great phenomenon. The introduction of prepaid cards and the fallen prices of mobile handsets have led to a rapid spread of mobile phones in the emerging economies (Orozco et al. 2007). This has opened up diverse opportunities for it to be used over and above voice communication. At the centre of this experience which comes from the convergence of advanced mobile communication technologies and the ability to use it for data services is mobile money transfer. There are currently over 2 billion mobile phone users and thus exceeding the number of banked people in the Emerging Economies (Hughes and Lonie, 2007).

The mobile money transfer (MMT) service is an aspect of a broader concept emerging in the electronic payment and banking industry referred to as Mobile Money. Even though mobile money

has not been well defined in the literature, it can be said to include all the various initiatives (long-distance remittance, micro-payments, and informal air-time bartering schemes) aimed at bringing financial services to the unbanked using mobile technology. However, Jenkins simply defined Mobile Money as money that can be accessed and used via mobile phone (Jenkins, 2008). Mobile Network Operators (MNO) in most emerging economies are at different stages of MMT implementations. Notably among the emerging economies are Philippines, South Africa, Kenya, Tanzania and most recently Nigeria, Ghana and Uganda. Whilst Safaricom's M-PESA has been hugely successful in Kenya, the adoption of similar implementations in the Philippines, South Africa and Ghana has not enjoyed similar success. Thus, this paper seeks to explore the key factors that affect consumer behavior towards the adoption and use of MMT in the emerging economies, specifically Ghana.

Studies on MMT falls between two main mobile technologies related research areas namely mobile payment and mobile banking. Whereas literature on the adoption of mobile banking (Cheng et al, 2006; Chen, 2008) and mobile payment (Fang et al, 2005; Wang et al, 2006) and the more broader scope of m-commerce (Dai and Palvia, 2008; et al, 2006) although not quite exhaustive have enjoyed significant attention of many scholars in recent times, research on mobile money is in its formative stages with a few DFID reports dominating (Jenkins, 2008; Porteous, 2006; Hughes, 2007) recent research. However, scholarly research on the new phenomenon of bringing financial services to the unbanked (Mobile Money) is generally said to be scarce (Maurer, 2008). There is therefore a need, to understand the users' acceptance of mobile Money and to identify the factors affecting their intentions to use mobile Money. This information can assist MNOs and service providers of mobile Money systems in creating services that consumers want to use, or help them discover why potential users avoid using the existing system. Hence the main objective of this paper is to develop a model that tries to predict the factors that affect consumer behavior towards the adoption of Mobile Money transfer in Ghana. What are the key determinants of user acceptance of mobile money transfer?

To answer this question a theoretical model is developed by combining aspects of Technology Acceptance Model (TAM) (Perceived Usefulness (PU), Perceived Ease of Use (PEOU)) and IDT (Relative Advantage (RA), Trialability) with additional constructs, Perceived Trust (PT) and Perceived Risk (PR), and empirically tested its ability in predicting user behavioral intention of Mobile Money.

We analyzed the data using Structured Equation Model (SEM) to evaluate the strength of the relationship between the constructs. The results provide support of an extended TAM model with PU, PEOU, PR, PT, and Trialability as key determinants in predicting the customers' intention of adoption and use of mobile money. The rest of the paper is organized as follows: Section 2 describes the Background of the Mobile Money Environment. Section 3 presents the theoretical framework; section 4 describes the research model and hypothesis; section 6 Discussion and Conclusion with suggestions for further studies.

2. Why Mobile Money is a Special Case?

Mobile phones use flourished in recent years and they are professed to be devices that serve the individual that owns it, they are also recognized as a social artifact (Katz, 1999). Apart from the social uses outlined, earlier studies by Leung and Wei (2000) indicate that utilitarian uses of the mobile phone are more frequent and instrumental motives are much stronger than social uses. Various types of business deals including cross country transactions are being conducted on mobile phones daily. The two fundamental attributes of the mobile phone which has led to its flourished usage are mobility and immediate access (Leung & Wei, 2000). However, De Gournay (2002) puts forward that mobility is unquestionably the most distinguished characteristic of the mobile phone. It is this characteristic which has extended its usage from a traditional voice communication to other value added services like games, internet, banking, payments and informational services.

The meaning of money is central to all forms of transactions. The expectations of electronic money revolutionizing the way we pay for goods and services were very high in the mid 1990s (Dodd, 1994). It was believed that electronic money will displace paper money and face-to-face transaction. This has not materialized yet. Will mobile money replace the need for cash? To answer this question we will need to understand the extent to which users are prepared to accept the electronic money as a means of exchange (Mas & Kumar, 2008). The two key roles of money are: as a store of value and a means of exchange[1]. Most of the emerging markets operate a cash economy with over 70% unbanked (Jenkins, 2008). Mobile phone's ability to store value and be used as a means of exchange will depend on users' adoption of the technology. Safaricom's M-PESA in Kenya has seven million or 38 percent of its cellular customers using a Mobile Money transfer and over ten thousand agents in three years of operation (Camner and Sjöblom, 2009). Finaccess (2009)

[1] David Birch's Digital Money Forum blog at http://www.digitalmoneyforum.com/blog.

showed that M-PESA has become the most popular method of money transfer in Kenya with 40% of all adults using the service. It also reported that M-PESAhas lead to an increase in the total remittance in Kenya from 17% in 2006 to 54% in 2009 (Camner and Sjöblom, 2009:2).

2.1. Money Transfer in Ghana

Ghana like most emerging economies has a great number of households that depend on domestic remittance. An increase in urbanization in city centres and constant migration in Ghana means that the need for money transfer services has been quite significant. And informal methods of remitting funds within Ghana to families and relatives are quite established with diverse difficulties and challenges. One of the key factors in the choice of remittance services everywhere is accessibility. Until recently, the main methods of remittance in Ghana have been through the "Bus Driver". People visit the bus station of the village or town that their families are based and with a little incentive plead with the bus driver to send their remittances for them. If accepted by the bus driver, the remittance gets to the family within hours. Other informal methods were using visiting family and friends or travelling long distances to remit the funds whenever necessary. Thefts, armed robbery and accidents are a few of the challenges with these methods of remittance.

3. Theoretical Background

In Information Systems literature, Roger's (1991) innovation diffusion theory (IDT), Davies' (1989) technology acceptance model (TAM), the extended technology acceptance model (Davis 1989), the theory of planned behaviour (Azjen 1977) and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al. 2003) have been used for the last two decades to explain possible consumer behaviour on adoption and acceptance patterns of new technologies and innovations. Several researchers have sought to develop constructs that affect consumers' behaviour when deciding on the adoption of mobile services by applying these existing information system theories and models (Wu and Wang, 2005; Hung et al, 2004; Bouwman et al, 2007).

A study of over forty literatures on mobile services shows that application of the above information system theories and models have extended to valued added mobile services (Barnes and Huff, 2003; Biljon et al, 2008; Carlsson et al. 2006; Chen, 2008; Muk, 2007; Teo and Pok, 2003). The most applied, tested and refined model is the TAM followed by UTAUT, IDT and then TPB. In

more recent contributions, researchers have used a number of contracts from all four areas and new constructs from other sources. For example, Barnes and Huff (2003) extended IDT by including trust and image as new constructs. Also, Tan and Teo (2000) included the perceived risk; subjective norm and self-efficacy. Pedersen et al (2001), posits that the TAM should be extended to include subjective norm and behavioral control constructs.

3.1. Technology Acceptance Model

Over the years TAM has been tested and applied in the prediction of future consumer behaviour (Adams et al., 1992; Chau and Hu, 2002; Davis and Venkatesh, (1996); Kwon and Chidambaram, (2000); Legris et al., 2003), among other places in the mobile services domain (Cheong and Park, 2005; Kwon and Chidambaram, 2000; Nysveen et al., 2005a). The Technology Acceptance Model (TAM) is established on the premises that the contracts, perceived usefulness and perceived ease of use are fundamental determinants of system adoption and use (Davis, 1989). These two beliefs create a favorable disposition or intention toward using the IT that consequently affects its use. Perceived Usefulness (PU) is said to be the degree to which a person thinks that using a particular system will enhance his or her performance. Whereas Perceived Ease of Use (PEOU) is "the degree to which a person believes that using a particular system will be free of effort"(Davis, 1989). TAM has received praises from earlier researchers on its contribution towards our understanding into consumer behaviour. Lu et al (2003, p.207) states that: "Throughout the years, TAM has received extensive empirical support through validations, applications and reapplications for its power to predict use of information systems". Also, Legris et al (2003, p202) concludes that "TAM has proven to be a useful theoretical model in helping understand and explain user behaviour in information system implementation".

3.2. Innovation Diffusion Theory

Another theory which has received similar attention by scholars in explaining consumer behaviour towards new technology is the Rogers' Innovation Diffusion Theory (Rogers, 1995). Innovation is defined as:

> "an idea, practice or object that is perceived as new by an individual or another unit of adoption", while diffusion is "the process by which an innovation is communicated

through certain channels over time among the members of a social system" (Rogers, 1995, p. 10).

By these definitions, innovation diffusion is achieved by how a social system accepts and begins to use (adopt) an idea or a technology. Roger further states that the following are the characteristics of any innovation: Relative Advantage: the degree to which the innovation is perceived as being better than the practice it supersedes; Compatibility: the extent to which adopting the innovation is compatible with what people do; Complexity: the degree to which an innovation is perceived as relatively difficult to understand and use; Trialability: the degree to which an innovation may be experimented with on a limited basis before making an adoption (or rejection) decision; and Observability: the degree to which the results of an innovation are visible to others (Rogers, 1995).

3.3. Application of TAM and IDT to Mobile Money

The various terms that relate to the use of mobile phones to access, store, and transfer or linked to an account; mobile banking, mobile payments, mobile money transfer and mobile microfinance are collectively referred to as Mobile Money (MM) in this study. Research on the adoption of MM can be seen as part of previous researches in mobile banking and mobile payments. Therefore it could be argued that the determinants of adoption in m-banking and m-payment environment should be appropriate to mobile money. TAM and IDT are considered to be extremely similar in some constructs and supplement one another (Wu, 2004). Some similarities can be drawn between RA and PU; Complexity and PEOU to the extent that some researchers identifies the TAM constructs as a subset of the Innovation Diffusion Theory (Wu, 2004). However, developing different measurements for RA and PU was found to be particularly important in MM adoption. However, complexity and PEOU is considered to be too similar to be separated in this study.

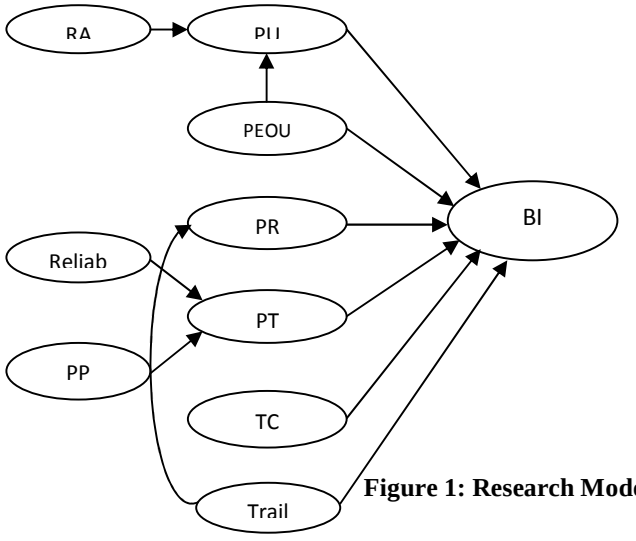


Figure 1: Research Model

4. Research Model and Hypothesis

Figure 1 depicts the research model for our study. It includes the key determinants for the TAM (Perceived Usefulness & Perceived Ease of Use) and some aspects of the Diffusion of Innovation Theory (Triability, Relative Advantage). It is supported by other constructs such as Perceived Trust (PT), Transactional Cost (TC) and Perceived Risk (PR). Also Reliability and Perceived Privacy are identified as antecedents of Perceived Trust.

Perceived Usefulness: PU is said to be the degree to which a person thinks that using a particular system will enhance his or her performance. Whereas the initial definition stated was about the usefulness in performing a job function, PU in the adoption of mobile services is defined in a broader context to include how well consumers believe mobile services can be integrated into their daily activities (Kleijnen et al, 2003). And in a mobile payment context it can also be defined as the degree at which the consumer believes that the MM transfer will enhance his transaction (Chen, 2008). When this belief increases, the consumer's intention to use the MM transfer services will also increase. In consumer behavior analysis PU has been well tested as a determinant for a consumer's intention to use mobile services. Also, the extent to which a consumer finds the MM transfer useful may depend on the RA of the service. If the mobility and easier accessibility characteristics of mobile services leads to a consumer belief that the MM transfer is better than its predecessors (other money transfer services) then that will affect its perceived usefulness. The ultimate reason people exploit MM transfer is that they find them useful (Luarn & Lin, 2005).

H1: Higher perceived usefulness will lead to higher behavioural intention to use MM.

H2: Higher Relative Advantage will lead to higher Perceived Usefulness

Perceived Ease of Use: PEOU is "the degree to which a person believes that using a particular system will be free of effort"(Davis, 1989). In MM transfer, it includes registration procedures, ease of use of the payment procedure, easy access to customer services, minimal steps required to make a payment, appropriate screen size and input capabilities. Also, the availability of the MM transfer agents will increase the PEOU. Furthermore, it should be accessible on mobile phones with the most basic features and software. Prior researches have concluded that PEOU is a key determinant to consumer behavioral intentions (Venkatesh &Davis, 1996, 2000; Venkatesh & Morris, 2000 Pousttchi and Wiedemann, 2005; Carlsson et al, 2005). In order to prevent the

''under-used'' system problem, MM transfer must be both easy to learn and easy to use (Luarn and Lin, 2005). And also the original TAM posits that perceived ease of use has a direct effect on perceived usefulness (Davis, 1989).

H3: Higher perceived Ease of Use will lead to a higher Perceived Usefulness

H4: Higher perceived Ease of Use will lead to a higher behavioural intention to use MM.

Perceived Trust: Mobile Money transfer environment, like all business transactions require an element of trust. To become a viable unit of doing business MM transfer should overcome user distrust (Siau et al, 2003). And for the purpose of this study, trust is defined as a measure of consumer's level of assurance that the service will be provided with minimum possible hindrance. Siau and Shen (2003) posits that trust in mobile commerce can be differentiated into two categories: trust in mobile technology and trust in mobile vendors. The existence of local agents who are well integrated into the communities will be necessary for this level of trust to be obtained. Users would expect some level of privacy from the agents. In addition overall network and service perceived reliability affect consumer's perceived trust in the service. The reliability can be measured by the successful utilization of the service over a period of time with little or no interference. Consumers need to have a belief that the network is reliable. Previous studies have found perceived trust as a significant determinant influencing consumers' behavior intention towards conduct electronic commerce transactions (Mallat, 2007; Gefen et al., 2003; Jarvenpaa et al., 2000). Although, PEOU has been identified as an antecedent to perceived trust in prior e-commerce adoption research, this was seen as not applicable to MM transfer (Gefen et al, 2003; Gu et al, 2009). The complexity of using the MM transfer applications will not necessarily be attributed to the trustworthiness of the service provider. Thus, privacy and reliability are seen as antecedents to perceived trust. And Perceived Trust is expected to have a direct effect on behavioural intentions.

H5: Higher Perceived Trust will lead to a higher behavioral intention to use MM

H6: Higher Reliability will lead to a higher Perceived Trust

H7: Higher Privacy will lead to a higher Perceived Trust

Perceived Risk: A consumer's perceived risk was identified by the selected consumers and MM professionals interviewed as a significant barrier for MM transactions. Perceived Risk is defined as a consumer's belief about the potential uncertain negative outcomes from the mobile money

transaction. Consumers' desire to minimize risk supersedes their willingness to maximize utility and thus their subjective risk perception strongly determines their behavior (Bauer et al, 2005). Thus, reducing uncertainty has been found to have a positive influence on consumers' intention to adopt electronic transactional systems (Chen, 2008).

H8: The higher the Perceived Risk will lead to a negative influence on behavioral intention to use MM

Transactional Cost: TC includes transaction price, registration fee, or cost of a new device if one is needed to use the service. Consumers interviewed confirmed that transactional cost can influence their behaviour intention to use the MM transfer services. Given that the original TAM was developed in an organizational context, the transactional cost of using technology was not considered as a relevant variable since the consumer was not responsible for the payment of the technology.

H9: Higher Transactional Cost will have a negative influence on consumer behavioral intention to use MM.

Trialability: the degree to which an innovation may be experimented with on a limited basis before making an adoption (or rejection) decision (Agarwal & Prasad, 1997; Tan & Teo, 2000). Thus, the adoption of MM transfer is more likely if the technology is demonstrated to the user or if it can be used on a free-at-first-use. Trailability has been found to have direct influence on consumer's behavioral intentions (Brown et al, 2003). Past research argues that earlier adopters of an innovation perceive trialability as more important than do later adopters. More innovative individuals have no precedent to follow when they adopt, whereas later adopters are surrounded by others who have already adopted the innovation.Also, our initial consumer interviews indicated that users will adopt MM transfer if given the chance to trial the service for free.

H10: The greater the trialability of MM transfer service, the higher the influence on user's behavioral intention to use.

5. Research Methodology

This study aims to predict the consumer behavior and intention to adopt Mobile Money Transfer services in Ghana by extending the TAM and IDT models with two extra constructs. The introduction of MMT services in Ghana has not enjoyed the successes experienced by other emerging economies like Kenya and Philippines. A survey was developed for the data collection.

The survey was conducted in Ghana Context. The data from the survey were tested using Structured Equation Model, and the unit of analysis was the prospective individual mobile money transfer customer in Ghana. In developing the model we reviewed existing literature extensively and then interviewed Mobile Money professionals of telecom providers who have either launched or about to launch their products and a selection of consumers. Based on the results of the interviews we developed our survey instruments using a multiple-item, five-point Likert scale approach.

The items in the survey were developed by adapting existing measures validated by other researchers in mobile banking and mobile payment environment, or by converting the definitions of the construct into a questionnaire format. Some of the items for the constructs; PU, PEOU PP and PR were adapted from Chen (2008) and modified for mobile money transfer, others were created to suit the Ghanaian environment. The TC items were captured using three items derived from Constantinides et al and real world experience. The items for Perceived Trust construct were adapted from Stewart (2003) and Pennington et al. (2003) and modified accordingly. Items for Trialability, Relative Advantage, Reliability, TC, and BI were created from their respective definitions. In total 32 items for 10 variables were developed. The PU construct is measured using 3 items (PU1-3); the PEOU is measured by 4 items (PEOU1-4). For the determinants of PU, Relative Advantage is measured using 2 items (RA1-2). PT is measured using 4 items (PT1-4) and its determinants, PP 4 items (PP1-4) and Reliability 2 items (Reliability1-2). The PR construct is measured using 5 items (PR1-5), TC is measured using 4 items (TC1-4) and Trialability is measured using 3 items, (Trialability1-3) and the Behavioral Intention construct is measured using 2 items (BI1-2).

The survey questionnaire consisted of four sections. Section A aimed at gathering information relating to respondent mobile phone usage. It was used to measure the respondent's mobile phone experience, which was based on the sum of the various usage indicated. Section B was limited to gathering information on the respondent's usage of money transfer service in the past. Section C was aimed at obtaining information on whether the respondent has used or intended to use mobile money transfer and what factors are likely to influence their adoption decision. The section is subdivided into the various constructs with a total of 32 items ranging between 2 and 4 items per

construct. Section D aimed at gathering demographic information about the respondent, including gender, age, employment status, education and income.

5.1. Data Collection

Data was collected using a self administered questionnaire to the general public at malls and other places. In total, 330 respondents were approached in the survey. A total of 302 accepted to participate and final 298 were collected. Since domestic money transfer is generally seen as a one way transaction from the urban cities to the rural areas, responses were collected from the three main cities in Ghana, Accra, Kumasi and Takoradi. However, respondents were not distinguished by where they filled in the questionnaire. The questionnaires were distributed by personally approaching the respondents on the street, at the mall, in their offices and at the universities and colleges and requested to participate in a social research involving the mobile money transfer. For the illiterate, our team members translate the questionnaire from English to Twi (a prime native language).

6. Research Results

Based on the two-step approach recommended by Anderson and Gerbing (1988), we first analyzed the measurement model to test the reliability and validity of the survey instrument, and then analyzed the structural model using AMOS version 18 to test our research hypotheses. The Structure Equation Model (SEM) was most useful when assessing the causal relationship between variables as well as verifying the compatibility of the model used.

6.1. Descriptive Statistics

A total number of 288 respondents were used in the analysis. The demographic profiles of the respondents are shown in table 1 below. The sample was made up of 65.2% male and 26.5% female with 85.7% below 50 years of age and a mean age of 30 years. With regard to education, the majority were at least university graduates or equivalent (about 67.3% including the postgraduates (Masters and Doctorates)). With regard to employment, company employees comprise the majority, at 44.3%, 28.8% students both full time and part time, whereas 15.6% were self-employed. To make it simpler for the respondent, the local currency was used for the study. At the time of the study, $1 was exchanged for 1.4 Ghana Cedis, approximately. Thus, about 43.5% of

the respondents earn more than $300 per month. According to annual income and educational levels, the majority of the respondents appear to belong to the lower middle class of the Ghanaian Society.

The respondents were largely mobile phone users (97%) with 49.3% belonging to more than one network provider. Over 60% of the respondent uses a combination of MTN and one of the five network providers currently operating in Ghana. However, respondents that use MTN only accounted for 33% of the sample. This confirms MTN as the largest Mobile Network Provider in Ghana based on this sample. With regard to the various uses of mobile phone, 35% of respondents use their mobile phone for receiving and making calls, SMS and listening to music. Only 15.2% of the respondents use their phones for only making and receiving calls. Other uses identified include internet (53%), SMS (87.5%), banking, game and music. Apart from the traditional usage of the phone, the respondents report and phone for some value added services.

The most popular form of money transfer identified was through bank transfer with 74% reporting to have used the bank for money transfer. Regarding knowledge of any MMT in Ghana, 85% of the respondents said yes with 93% answered to have heard of the MTN Mobile Money Transfer through advertisements. However, only 10% claimed to have used the service. Knowledge of the service was not reflective of its usage. The intention to use Mobile Money Transfer was found to be below average with 48.4% responding affirmative, 28.3% no and 23.3% unsure.

6.2. Construct Reliability and Validity Analysis

Cronbach alpha in SPSS version 16 was used to test the reliability of each of the multiple-item constructs that form the survey instrument. It is the most popularly used measures of internal consistency. As a rule of thumb, a reliability coefficient of .70 or higher is considered “acceptable” in social science research (Nunnelly, 1978). This meant that all but three constructs Reliability, Perceived Privacy and Transactional Cost did not meet the reliability test. The reliability of each construct is illustrated in Table 2 below. However, the PP construct was considered acceptable for use because of its closeness to .70 rule of thumb and Reliability and TC were removed from the model and further analysis. There was little or no consistency between the items used for these constructs.

The data were subjected to exploratory factor analysis to establish convergent and discriminant validity of the proposed MMT uniqueness using Principal Component Analysis (PCA) as the extraction method and Varimax rotation with Kaiser Normalization as the rotation method. Two rounds of factor analysis were conducted. Initially, a ten-factor structure was suggested and the results showed seven orthogonal factors with eigenvalues above 1.0 and three others very close to 1.0 (.983, .954, .923). A further factor analysis was conducted with only the seven constructs identified with cronbach alpha above .70 and seven factors with eigenvalues above 1.0 was generated. Thus eliminating PP construct as well. The seven factors were maintained for the model and further analysis. The Kaiser-Meyer-Olkin measure of sampling adequacy was found to be 0.857. Thus, the application of factor analysis was deemed appropriate. The factors selected explain 72% of the variances of the variables and a commonality ranging between .853 and .555. Items for PR, PT, RA, Trialability, and BI loaded at greater than 0.4 on their respective factors and are thus deemed valid (as in Tan & Teo, 2000). However, PU loaded on two factors above .40. Correlation analysis reveals that these are still distinct constructs, as the coefficient between them is only 0.30. This finding does reveal, however, that PU and PEOU are closely linked in the minds of respondents. Table 2 illustrates the validity of the constructs and their respective factor loading.

Table 1: Reliability of the model constructs (n=288)

	Cronbach alpha	Mean	SD	# Items		Cronbach alpha	Mean	SD	# Items
PU	.904	10.919	2.725	3	Trialability	.844	11.860	2.406	3
PEOU	.907	15.131	3.254	4	Reliability	.503	8.150	1.515	2
PR	.863	15.390	4.832	5	Relative Advantage	.852	7.244	1.866	2
PT	.788	13.696	3.191	4	Perceived Privacy	.675	11.268	2.316	3
TC	.365	14.320	2.610	4	Behavioral Intention	.807	7.495	1.643	2

Table 2: Rotated Component Matrix

	Component						
	Perceived Ease of Use	Perceived Risk	Perceived Trust	Trialability	Perceived Usefulness	Relative Advantage	Behavioral Intentions
PU1	.409	-.089	.201	.147	**.641**	.314	.157
PU2	.433	-.104	.111	.131	**.695**	.175	.207
PU3	.402	-.132	.092	.100	**.749**	.166	.245
PEOU1	**.775**	-.107	.126	.162	.284	.083	.227
PEOU2	**.727**	-.068	.164	.122	.371	.137	.282
PEOU3	**.791**	-.036	.276	.160	.155	.219	.082
PEOU4	**.808**	-.060	.267	.206	.147	.092	.046
Risk1	-.108	**.855**	-.003	.130	.037	.015	-.105
Risk2	-.041	**.854**	-.045	-.003	-.071	-.047	-.043
Risk3	-.024	**.854**	-.064	-.010	-.037	-.017	-.013
Risk4	-.037	**.872**	-.062	.029	-.116	-.070	-.033
Risk5	-.051	**.511**	-.225	-.009	-.412	.142	.345
Trust1	.277	-.098	**.684**	.065	-.127	.272	-.018
Trust2	.203	-.005	**.724**	.098	.109	.293	.121
Trust3	.184	-.087	**.829**	.061	.092	.065	.164
Trust4	.081	-.082	**.680**	.177	.330	-.060	.101
RA1	.208	-.064	.251	.177	.157	**.791**	.161
RA2	.179	-.004	.172	.239	.181	**.817**	.150
Trial1	.164	.018	.188	**.813**	.122	.161	.076
Trial2	.146	.014	.030	**.842**	.145	.111	.225
Trial3	.165	.120	.105	**.868**	-.013	.115	-.019
BI1	.227	-.056	.121	.220	.227	.225	**.752**
BI2	.272	-.102	.283	.085	.185	.103	**.776**

6.3. Structural Model Test

SPSS Amos 18 was used to generate the common model-fit indices. Structural modeling evaluates whether the data fit a theoretical model. The following common model-fit measures were used to estimate the measurement model fit; chi-square/degree of freedom (χ^2/df), the comparative fit index (CFI), root mean square error of approximation (RMSEA), root mean square residual (RMR), the normed fit index (NFI), Relative Fit Index (RFI) and the Tucker Lewis coefficient (TLI). Table 4 shows the estimates from AMOS structural modeling. According to Gerbing and Anderson (1992),

the criteria for an acceptable model are as follows: RMSEA of 0.08 or lower; CFI of 0.90 or higher; NNFI of 0.90 or higher. The fit between the data and the proposed measurement model can be tested with a chi-square goodness-to-fit (GFI) test where the probability is greater than or equal to 0.9 indicates a good fit (Hu & Bentler, 1999). The GFI of this study was 0.87 close to the recommended 0.90 or greater. Although the model does not show a perfect fit in the goodness-to-fit index used within the sample size of 288, the other measures fitted satisfactorily; CFI=0.92, TLI=0.90, IFI=0.92 and NFI=0.87 with $\chi^2/df < 3$ at 2.51 and the RMSEA=0.07 (Bagozzi & Yi, 1988).

Table 3: Fit Indices

Fit Indices	**Results**	**Recommended Values**
chi-square/degree of freedom (χ^2/d.f.)	2.51	<5 (Bagozzi & Yi, 1988)
comparative fit index (CFI)	.0.92	Approaches 1
root mean square error of approximation (RMSEA)	0.07	>0.06 (Joreskog & Sorbom, 1996)
normed fit index (NFI),	0.87	
Tucker Lewis coefficient (TLI)	0.90	Approaches 1(Byrne, 2001)
IFI	0.92	Approaches 1

6.4. Hypothesis Analysis

Given the satisfactory fit of the model, the estimated path coefficients of the structural model were evaluated to test the hypothesis identified earlier. Multicollinearity was ruled out because the correlations between independent variables are all less than 0.8 as shown in table 4 below. With elimination of Transactional cost, Privacy and Reliability from further analysis after the reliability test has reduced the number of hypotheses tested to 7. Based on the results from the Amos 18, the results are presented as predicated by the conceptual model path in Figure 1.

Table 4: Results of Hypothesis testing

			Estimate	S.E.	C.R.	P	Results of Hypothesis testing
PU	<---	RA	0.22	0.05	5.02	***	Supported
PU	<---	PEOU	0.76	0.07	11.08	***	Supported
BI	<---	PU	0.27	0.08	2.75	0.01	Supported
BI	<---	PEOU	0.30	0.1	3.09	0.00	Supported
BI	<---	Trial	0.17	0.07	2.51	0.01	Supported
BI	<---	Risk	-0.02	0.04	-0.39	0.69	Supported
BI	<---	Trust	0.19	0.07	2.75	0.01	Supported

S.E. is an estimate of the standard error of the covariance.

C.R. is the critical ratio obtained by dividing the covariance estimate by its standard

In support of H1, we found a significant and positive relationship between the perceived usefulness of mobile money transfer and consumers' intention to use the service (0.23 $p<0.05$). This confirms the original TAM relationship between perceived usefulness and intention to adopt new technology. Also the path coefficient of 0.26 and a significant level of less than 1% points to a strong positive relationship between Relative Advantage and Perceived Usefulness. Hence, H2 is also confirmed. The path coefficient between Perceived Ease of Use and Perceived Usefulness was the highest at 0.80 at a significance level of less than 0.1% indicating a strong relationship between the two factors. Thus, H3 is supported. In addition the relationship proposed in H4 is also supported; that is, perceived ease of use also predicts users' intention to use mobile money transfer services at a significant level of less than 1%. Further, the structural link between the Trust and BI and also Trial and BI were both found to be significant with a path coefficient of 0.19 and 0.17 respectively at a significant level of 1%. Thus, consumers' trust in Mobile Money Transfer and their ability to trial the product will significantly affect their intention to use the service.

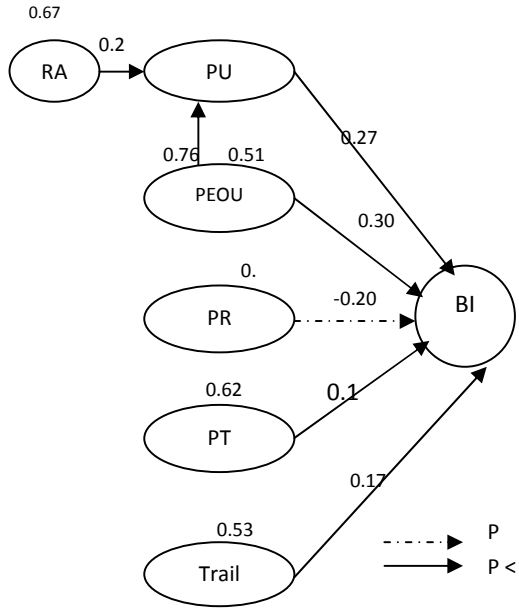


Figure 2: Standardised path coefficients – Results of the model

Table 5: Correlations

	Trust	Risk	Trial	RA	PEOU	PU	BI
Trust	1						
Risk	-.140**	1					
Trial	.350**	.083	1				
RA	.661**	-.109*	.399**	1			
PEOU	.629**	-.153**	.386**	.587**	1		
PU	.582**	-.192**	.336**	.626**	.835**	1	
BI	.634**	-.133*	.460**	.596**	.742**	.714**	1

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

7. Discussion and Implications

The general feeling of the sample about mobile money can be summed up as "I have heard about it but not used it". As indicated above, 93% of the respondents reported to have heard about mobile money through advertisements. As at the time of the study, MTN's mobile money and Zain's ZAP were the only two mobile money transfer services available in Ghana. MTN had launched its mobile money transfer with the huge advertisement campaign (including billboards, radio, TV commercials) both in the cities and rural areas. Despite all the promotion and direct publicity, the adoption of the service was very low with only 10% claiming to have used the service. It did not enjoy the viral effect and spread of the service that Safaricom's M-PESA enjoyed. More than 18months after MTN's launch and there is still no signs of significant uptake of the service. It was therefore necessary to model the factors that predict the Ghanaian consumers' adoption of the service.

This study aims to predict the intention to adopt mobile money transfer service in a convenience sample of Ghanaian citizens, who were asked to complete a questionnaire that was based on relevant adoption research and theories. This is one of the first studies to empirically test consumers' intention to use mobile money transfer. As an extension to TAM, we included items for Perceived Risk, Perceived Trust, Trialability, and Transactional Cost as key determinants to

consumers' intention to use mobile money transfer services. Furthermore, we suggested that Perceived Privacy and Reliability are antecedents to Trust whereas Relative Advantage and PEOU affect PU. However, Perceived Privacy, Reliability and Transactional Cost did not pass the validity and reliability test and were excluded from the model.

In general the structural equation modeling with AMOS 18 in this study supports the results of previous extended TAM research (Gefen, 2000, 2003;Gefen et al., 2003a; Pavlou, 2003; Suh & Han, 2002; Wang & Benbasat, 2005) with perceived ease of use (β=0.30), perceived usefulness (β=0.27) Perceived Risk (β=-0.20) and Perceived Trust (β=0.19) as key determinants of behavioral intention. Perceived usefulness is directly affected by perceived ease of use (β=0.76) and relative advantage (β=0.22). Perceived ease of use is the most significant construct on perceived usefulness and affects behavioral intentions both directly and indirectly through perceived usefulness. This is consistent with previous research (Gu et al. 2009). The results therefore suggest that mobile money transfer providers should consider how to make the use of the services easy. Also, the trialability construct showed a significant effect on Behavioral intentions (β=0.17) and suggests that there should be opportunities for customers to trial and test the mobile money transfer service and even see demonstrations of how it works. This would raise awareness, and give people a greater understanding of the technology.

Another point of interest in this study was how perceived risk and perceived trust affects behavioral intention in mobile money transfer services. The results show that perceived trust (β=0.19) has a significant effect on consumers' behavioral intentions. We were expecting an even higher path coefficient for perceived trust because of the nature of mobile money transfer service. From the descriptive statistics, most of the respondents use some form of money transfer regularly with most of it being through banks or friends and family. The trust level of existing money transfer services seem to be quite significant. Furthermore, from a theoretical perspective, it seemed reasonable that a higher perceived risk in MMT service will lead to a lower rate of intention to use. Furthermore, perceived risk was believed to be a predictor and barrier to Mobile money transfer services, and expected to negatively influence consumer's behavioral intent. This was supported by the study but at a very low significant level (β=-0.20, p>0.5). Since majority of the respondent and the populace of Ghana had no prior experience of electronic transactions we expected an even more significant negative relationship between perceived risk and behavioral intentions. The

findings of our initial interviews before the survey did not reflect on the actual survey results. The Antecedents of Trust, Privacy and Reliability and also risk were perceived to be the most important determinants of consumers' intention to use mobile money transfer. How can we rely on network providers to transfer our money when their network is always down? What happens to our money when the network is down for a day or two? And who is ultimately responsible, the merchant or the network provider, where some of the questions that was asked during those interviews.

This study intended to be a valuable source for further empirical and conceptual research on mobile money transfer services. Besides its general contribution of identifying, conceptualizing and operationalising the key factors that predicts its acceptance and adoption in the emerging markets, the results can be used for further investigation into the success and or failure of other mobile money related services. It provides further understanding into the attitude of the Ghanaian consumer towards mobile data services in general and the use of mobile phones for financial services specifically. A further qualitative study into why the update in Ghana has not been overly successful with specific emphasis on early adopters may be necessary in the future. Also, the developmental impact of mobile money transfer in the emerging economies will be significant for the further development of this service.

Although our study provides some interesting insights into the factors affecting the intention to use mobile money transfer, it has some limitations. First, the exposure to mobile money transfer in Ghana is still in its infant stages, and we had to explain to most respondents what it is. Insufficient understanding of mobile money transfer and its applications does affect consumers' intention to use the service. Also a number of our respondents were illiterate and the translation of the questionnaire may affect their understanding and interpretation. Finally, the survey was conducted the main cities of Ghana and may not be a perfect representation of the entire population.

8. Conclusion

This survey conducted to model the antecedents of consumer behavior towards the adoption of Mobile Money Transfer in Ghana. Since the introduction of mobile money by MTN in Ghana, other telecom network providers have been investigating the possible impact of this MTN new service to their customer base in Ghana. For example Zain the most recent provider in the country has just launched their version of mobile money called ZAP. The provisions of both services are quite similar

in principle. The impact of mobile money in the first few years of its introduction in Kenya has risen the expectations of network providers towards similar introductions in the emerging markets.

The following is a summary of the results of this study. In support of TAM, Perceived Ease of Use and perceived usefulness were found to be the most significant determinants to intention to use mobile money transfer in Ghana. Perceived Trust, Trialability and Perceived Risk were also found to significantly affect Intention. As part of financial services, the adoption of mobile money transfer is dependent on consumers' perception on Trust and Risk. Thus, the findings support the traditional view on the effect of risk and trust on usage of financial services. Furthermore, the need for potential consumers to trial the service before adoption was significantly confirmed.

9. References

Anderson, J. E., & Schwager, P. H. (2003). SME ADOPTION OF WIRELESS LAN TECHNOLOGY APPLYING THE UTAUT MODEL. *Proceedings of the 7th Annual Conference of the Southern Association for Information Systems*, (pp. 39 -43).

Anderson, P. F. (1986). Marketing, Strategic Planning and the Theory of the Firm. *Journal of Marketing* , 15 - 26.

Barnes, S. J., & Huff, S. L. (2003). *RISING SUN: IMODE AND THE WIRELESS INTERNET.* FERRUCCIO SARDELLA.

Bauer, H. H., Barnes, S. J., Reichardt, T., & Neumann, M. M. (2005). DRIVING CONSUMER ACCEPTANCE OF MOBILE MARKETING A THEORETICAL FRAMEWORK AND EMPIRICAL STUDY. *Journal of Electronic Commerce Research* , 181 - 192.

Biljon, J. v., & Kotzé, P. (2008). Modelling the Factors that Influence Mobile Phone Adoption.

Bouwman, H., Carlsson, C., Molina-Castillo, F. J., & Walden, P. (2007). Barriers and drivers in the adoption of current and future mobile services in Finland.

Carlsson, B. (2005). Internationalization of innovation systems:A survey of the literature.

Carlsson, C., Carlsson, J., Hyvönen, K., Puhakainen, J., & Walden, P. (2006). Adoption of Mobile Devices/Services – Searching for Answers with the UTAUT. *Proceedings of the 39th Hawaii International Conference on System Sciences*, (pp. 1 - 10).

CHEN, H. (2008). Individual Mobile Communications Services and Tariffs . Daqing, Heilongjiang, China.

Chen, L.-d. (2008). A model of consumer acceptance of mobile payment. *International Journal Mobile Communications,* 32 - 52.

Cheng, T. E., Lam, D. Y., & Yeung, A. C. (2006). *Adoption of internet banking: An empirical study in Hong Kong.* Elsevier B.V. Doi.

Constantiou, I. D. (2008). Consumer behaviour in the mobile telecommunications' market: The individual's adoption decision of innovative services. Elsevier.

Constantiou, I. D., Damsgaard, J., & Knutsen, L. (2007). The Four Incremental Steps Toward Advanced Mobile Service Adoption.

Constantiou, I. D., Papazafeiropoulou, A., & Vendelø, M. T. (2009). *Does Culture Affect the Adoption of Advanced Mobile Services? .*

Crabbe, M., Standing, C., Standing, S. and Karjaluoto, H. (2009) 'An adoption model for mobile banking in Ghana', *Int. J. Mobile Communications*, Vol. 7, No. 5, pp.515–543.

Cyr, D., Head, M., & Ivanov, A. (2006). Design Aesthetics Leading to M-Loyalty in Mobile Commerce.

Dahlberg, T., Mallat, N., Ondrus, J., & Zmijewska, A. (2008). *Past, present and future of mobile payments research: A literature review.* Elsevier B.V. Doi.

Dai H. & Palvia P (2008) Factors Affecting Mobile Commerce Adoption: A Cross-Cultural Study in China and The United States; Americas Conference on Information Systems.

DODD, N. (1994) *The Sociology of Money: Economics, Reason and Contemporary Society.* Cambridge: Polity Press.

Hughes, N. & Lonie, S. (2007) "M-PESA: Mobile Money for the "Unbanked" Turning Cellphones into 24-Hour Tellers in Kenya". Innovations: Technology, Governance, Globalization 2(winter & spring edition), 63-81.

Hung, S.-Y., Ku, C.-Y., & Chang, C.-M. (2004). Critical factors of WAP services adoption: an empirical study. Elsevier.

Jenkins, Beth. 2008. "Developing Mobile MoneyEcosystems." Washington, DC: IFC and the HarvardKennedy School.

Leung, L., & Wei, R. (2000). More than just talk on the move: Uses and gratifications of the cellular phone. Journalism and Mass Communication Quarterly, 77, 308–320.

Lu, J., Yao, J. E., & Yu, C.-S. (2005). Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology. *Journal of Strategic Information Systems* , 245–268.

Luarn, P, & Lin, H.-H. (2004). Toward an understanding of the behavioral intention to use mobile banking. Elsevier.

Leung, L., & Wei, R. (2000). More than just talk on the move: Uses and gratifications of the cellular phone. Journalism and Mass Communication Quarterly, 77, 308–320.

MacInnes, I., Moneta, J., Caraballo, J., & Sarni, D. (2002). *Business Models for Mobile Content: The Case of M-Games.* Mallat, N. (2007). Exploring consumer adoption of mobile payments – A qualitative study. *Journal of Strategic Information Systems* , 413–432.

Maurer, B. (2008). Retail electronic payments systems for value transfers in the developing world. Retrieved 15 July 2010, from Department of Anthropology, University of California, Irvine: http://www.anthro.uci.edu/faculty_bios/maurer/Maurer-Electronic_payment_systems.pdf

Muk, Alexander (2007) Cultural influences on adoption of SMS advertising: A study of American and Taiwanese consumers. Journal of Targeting, Measurement and Analysis for Marketing, 39 – 47

Orozco, M., K. Jacob J. Tescher (2007) 'Card-based remittances: a closer look at supply and demand' (mimeograph), Chicago , Illinois : The Center for Financial Services Innovation.

Porteous, David. 2006. "The Enabling Environment for Mobile Banking in Africa." Boston: Bankable Frontiers. http://www.bankablefrontier.com/assets/ee.mobil.banking.report.v3.1.pdf.

Teo T.S.H & Pok S.H (2003) Adoption of WAP-enabled mobile phones among Internet, Omega 31 483 – 498 users

Wu J.H, & Wang S.C. / Information & Management 42 (2005) 719–729

Zhou, T., et al. Integrating TTF and UTAUT to explain mobile banking user adoption. Computers in Human Behavior (2010),

Understanding the characteristics of early and late adopters of technology:

The case of Mobile Money

Tobbin, P., & Adjei, J. (2012). Understanding the Characteristics of Early and Late Adopters of Technology: The Case of Mobile Money. *International Journal of E-Services and Mobile Applications (IJESMA)*, *4*(2), 37-54.

ABSTRACT

Every year, thousands of new technological ideas are conceived. An ability to innovate these ideas has been and will continue to be critical in surviving the current business world. This study attempts to identify and empirically assess the characteristics of technological innovativeness. A research model based on the existing literature on consumer innovativeness is thus presented. The model is tested via a survey instrument from a population of early adopters of mobile money services in Ghana and analyzed using ANOVA and independent sample t-test techniques in SPSS. The results showed that early adopters of technology are younger, novelty seekers, and likely to have a good employment and opinion leadership than late adopters. The study contributes to the diffusion literature by providing further empirical evidence on the distinctive characteristics of early and late adopters of technology and posits that contrary to past research, independent judgment making of an individual does not affect his innovativeness.

***Keywords*:** Mobile Money, Adoption, Diffusion, Innovativeness, early adopters

1. INTRODUCTION

Every year, thousands of new technological ideas are conceived. An ability to innovate these ideas has been and will continue to be critical in surviving the current business world. Hence, the diffusion of technological innovations and consumer adoption behavior persist as an important issue for researchers in the past few decades. Whereas some researchers have devoted significant research activities on developing theoretical models (Venkatesh, 2003; Davis et al., 1989) to explain the phenomenon, others have sought empirical support for the conceptualizations (Cheng et al, 2006; Chen, 2008). However, the majority of these researches has been focusing on identifying the

perceptions of the technology attributes (e.g. Perceived usefulness), called innovation characteristics, that influence technology acceptance decision. There is very little research that has been conducted to identify the distinctive characteristics of early adopters and late adopters (Rijnsoever & Donders, 2009) within the mobile data services domain. Moreover, there is enough evidence in the literature to suggest that there are benefits to be gained from being able to identify and target early adopters of an innovation (Goldsmith and Flynn, 1992; Mcdonald & Alpert, 2007). The early adopters represent an important cash flow for the company eager to recover some of its product development cost and hence marketers will like to understand the basic characteristics of such people to target them.

Mobile money, which is generally referred as a suite of financial services offered through mobile phones, is one of the newest forms of services resulting from the rapid convergence of communication technologies to be widely deployed in the developing economies (Dolan, 2009; Jenkins, 2008). The newness of this innovation provides an opportunity to make contributions to the innovation diffusion literature by examining the characteristics of its early adopters. It is thus both challenging and topical to explore the characteristics of Mobile Money users at this early market stage and to identify potential predictors of further adoption and, eventually, mass acceptance of this phenomenon.

Understanding the key characteristics of early adopters is obviously of theoretical and practical relevance to behavioral science (Bartels & Reinders, 2010). From a theoretical perspective, it will enable researchers to develop richer theoretical models to explain the adoption behavior across different types of consumer products (Agarwal & Prasad, 1998). It will also assist practitioners to target the relevant consumers to facilitate the diffusion of an innovation. Specifically, this study looks at its application to a mobile money service. The research question is thus formulated as *follows: How do the early adopters of mobile money differ from its late adopters?*

The study aimed at exploring this question through a novel analytic perspective drawing on literature from consumer innovativeness and innovation diffusion research. The general motivation of this study is to contribute to the existing discussions on the factors that affect the adoption of mobile data services. The study specifically focuses on the early adopters of technological innovations, attempting to uncover their unique characteristics and reveal their motivations,

thereby investigating the innovativeness of early adopters of mobile money services. Finally the study also contributes towards the theoretical debate on what consumer innovativeness really is. A review of existing literature on consumer innovativeness indicates that the majority of studies has been conducted with target innovations that have been in existence for some time. A significant contribution of this study is the empirical testing of these constructs on a new innovation in the domain of mobile data services.

The rest of the paper is organized as follows; first, we provide the theoretical framework of the study which contains a contextual description of mobile money, adopter categories, demographic variables and consumer innovativeness leading to our research model. Then, our research methodology as relates to data collection and measurement test and validity analysis is described. The section that follows outlines the results providing the demographic profile and the psychometric analysis. The discussions and conclusions of the results are then provided. Finally research limitations are identified.

2. BACKGROUND - MOBILE MONEY

The phenomenon of interest in this study is to explore the distinctive characteristics of early and late adopters of mobile money in Ghana. Mobile money can be defined as a suite of financial services offered through mobile phones and other handheld mobile devices (Dolan, 2009). The key services included in the mobile money domain are person-to-person money transfer (domestic and international remittances); phone top-up (paying of credit units); mobile payment for retail transactions (including payment of bills) and mobile banking (Hughes & Lionie, 2007; Ivatury, Gautam & Mas, 2008).

As a mobile data service, mobile money is one of the newest forms of services resulting from the rapid convergence of communication technologies to be widely deployed in the developing economies. The newness of this innovation provides an opportunity for which contributions can be made to the general theoretical debate on what constitute innovativeness and the characteristics of technology innovators. Since it was first launched as SMART Money in the Philippines in 2003, at least 72 mobile money deployments have been launched across 42 developing countries (Mas & Radcliffe, 2010). The year 2010 alone saw 31 new mobile money deployments in 25 countries. So

far the most successful deployment of mobile money is Safricom's M-PESA in Kenya. Since its launch in March 2007 it has been adopted by 11.7 customers (corresponding to 54% of Kenya's adult population and 73% of Safaricom's subscriber base) and processes more transactions domestically than Western Union does globally (Mas & Radcliffe, 2010).

Within the last two years, Mobile Money services have been introduced by three MNOs in Ghana, namely, MTN, Zain and Tigo. However, the value of Mobile Money services can only be realized when consumers embrace and use the innovation (Tobbin, 2010). Like most innovations, MM services are generally risky, in that, although the benefits of adopting the innovation may be available to all adopters, there is no guarantee that an individual will have the desired consequences upon adoption (Agarwal & Prasad, 1998). Therefore an understanding into the behavior of consumers on the acceptance of innovations in the mobile money domain is deemed to be critical to the success or failure of the services.

3. THEORETICAL FRAMEWORK

Conceptually, there are two primary theoretical explanations used to understand adoption and use of technological innovations among early adopters and late adopters. The first relates to the personal characteristics such as income level, age, gender and level of education of consumers that determine their innovative behavior. The second explanations presuppose that there is a generalized unobservable predisposition referred to as "innate innovativeness" (Hirchman, 1980) that influences consumer innovative behavior. The theoretical framework for this study is developed based on these two explanations described below.

3.1 DEMOGRAPHIC VARIABLES

Demographic profiling is the process of splitting the market by considering personal similarities and differences, such as gender, age, marital status, occupation, income, and household structure. Such descriptive attributes have been used in most consumer analysis studies. The relationship between socioeconomic characteristics and consumer behavioral intentions has been widely researched by both innovation diffusion and technology adoption researchers (Im et al., 2003; Meuter et al.,

2005). For example, Wei (2001) studied the socioeconomic characteristics of mobile phone laggards in Hong Kong, Tjøstheim and Boge (2001) studied the demographic characteristics of early adopters of mobile commerce when compared to non-adopters, while Mante-Meijer and Haddon (2001) did the same for general mobile services like voice and messaging. However, in spite of this attention, their effect on technology adoption is found to be less significant or often conflicting.

The level of education of an individual is found to be directly related to their level of resources, and hence their ability to experiment and adopt new technological innovations (Chia, Li, Detenber, & Lee, 2006; Van den Bulte, 2000; Yang, 2005). However, the effect of income and age on innovativeness has enjoyed mixed results from innovation diffusion studies. Whereas Im et al. (2003) and Steenkamp, Hofstede and Wedel (1999) found no significant effect of income, age and education, Tellis et al (2009) and Rogers (2003) reported a positive correlation. Tellis et al. (2009) in a cross-country study of consumer innovativeness posits that the five demographic variables of age, income, mobility, education and gender are key predictors of consumer innovativeness. Furthermore, studies by Ha and Stoel (2004), Rogers (1995) and Goldsmith et al. (1995) collectively show that innovative consumers are in general better educated and younger than the general population, have higher incomes and occupational status, and are more often female than male. Meanwhile, Tellis et al. (2009), Goldsmith et al. (2003) and Steenkamp et al. (1999) reported a negative correlation between age and consumer innovativeness. In its application to mobile money, the specific characteristics of the adopter may depend on the particular service within the mobile money domain. Whereas the adopters of the mobile payment elements are likely to meet the description above, those of mobile top-up and mobile banking may not necessarily have the same characteristics. The mobile banking aspect of mobile money is aimed at targeting the non bankers that are likely to be less educated with lower income (Jenkins, 2008). However, in general the early adopters are likely to be relatively advantaged than the late adopters in the same social system. Based on the previous literature review, the following hypothesis is formulated:

H1: Earlier adopters of Mobile Money Services are in general better educated (H1a), younger (H1b) and likely to be male (H1c) than later adopters.

3.2 CONSUMER INNOVATIVENESS

Innovativeness influences the speed at which the adoption of a product take place after it has entered the market. Innovation diffusion research on consumer innovativeness has studied innovativeness on three different dimensions: Innovative Behavior (IB) which deals with a realized (actualized) innovativeness, Personality Traits Innovativeness (PTI) also referred to as innate innovativeness and Domain-Specific Innovativeness (DSI). There have been very little consensus on the definition of innovativeness with DSI and PTI dominating the various discussions (Roehrich, 2004). Bartels and Reinders (2010) in their paper on consumer innovativeness posits that out of the 79 papers studied, 44 were based on PTI, 41 on DSI and 24 on IB. Studies on PTI and DSI far exceed that of IB.

3.2.1 Innovative Behavior

Roger's time dependent definition of innovativeness (also referred to as actualized innovativeness) as "the degree to which an individual is relatively earlier in adopting new ideas than other members of a (social) system" led to the categorization of adopters (Roger, 2003) into innovators, early adopters, early majority, late majority and laggards. It reflects an actual displayed behavior rather than a predisposition to act in a certain way (willingness to adopt). A number of researchers had since taken a measure of time to assign individuals to adopter categories (Goldsmith & Hofacker, 1991). Wei (2001) also applied this concept in classifying all those who have not adopted cellular phones in Hong Kong by 1998 to be "Laggards". Hirschman (1980) in trying to relate innovativeness to inherent novelty seeking argued that innovative behavior can be subdivided into: vicarious, adoptive and use innovativeness. Vicarious innovativeness is to measure the individual's new information seeking abilities over a given timeframe, whereas adoptive innovativeness measures the individual's actual purchase of products within a given timeframe. Use innovativeness is defined as the use of an existing product in an unusual way.

However, this dimension of consumer innovativeness has been heavily criticized. First, it has been criticized to give very little meaning to what leads to an innovative behavior and therefore does not explain why an individual will be among the first to adopt an innovation. It therefore does not offer an ability to predict the behavior of innovators and early adopters (McDonald & Alpert, 2007). This

is probably the most crucial limitation of Roger's measurement of innovativeness (Agarwal & Prasad, 1998). Also by definition, both Midgley & Dowling (1978) and Flynn and Goldsmith (1993) argued that innovativeness is a hypothetical construct thus should not be measured as an observable phenomenon. In addition it is situated at a higher level of abstraction than the actualized innovativeness and focuses on the level of innovativeness which is observable in behavior. However, this study chooses IB as the independent variable measured by an innovate_behavior scale computed from two dichotomous variables: "Have you ever used Zain's mobile money services (ZAP)?" Whilst this is a limited behavioral measure, we deem it acceptable as it taps the actual behavior in which we are interested. The critics of innovative behavior propose a conceptualization of innovativeness based on personality traits.

3.2.2 Personality Trait Innovativeness (PTI)

Further research recognized innovativeness as a factor of personality traits. Midgley & Dowling (1978) defines innate innovativeness as "the degree to which an individual makes innovation decisions independently from the communicated experience of others" (p.49). This definition implies a link between innate innovativeness and the amount of communication consumers need and use before making a decision. So, the more innovative an individual, the less likely he/she will use the communicated experiences of others before adopting the innovation. The adoption decisions of innovators are thus based on their own intuition and vision, rather than well-established references. Thus, Midgley & Dowling (1978)'s definition is often conceptualized as an independent judgment making (IJM) (Manning et al. 1995). Therefore, early adopters are likely to be consumers who do not rely on others for information and assistance when making a decision to acquire a new product or service. Hirschman (1980) also equated innovativeness to an inherent novelty seeking (NS) and defined it as "the desire of the individual to seek out new product information" (p. 285). The diffusion of an innovation will be faster if there is both higher novelty seeking and higher independent judgment making. Thus, the ability to be earlier in adopting the technological innovation must be based on personality characteristics with little or no communication influence.

These definitions are consistent with a long tradition in the literature and are similar in spirit to all other conceptual definitions that consider innovativeness as a generalized personality trait. For an

earlier adopter to be a genuine innovator, they need to have actively sought information about the new product and then goes ahead to adopt without the need for subjective information from the social system. Also, several researchers (Foxall, 1994; Midgley & Dowling, 1978; Venkatraman, 1991) agree that personality trait innovativeness should provide an explanatory basis for innovative behavior. A three staged longitudinal study conducted by Manning et al (1995) of novelty seeking and consumer independent judgment showed a significant influence on adoption. However, most PTI scales have demonstrated rather a low correlation between what they claim to measure and IB (Roehrich, 2004). Furthermore, even though Manning (1995) found evidence that IJM and NS have a generalized effect on the adoption process across a variety of goods and services, other studies have reported inconclusive findings on the impact of IJM on Innovative Behavior (Im et al.,2003). Therefore, further empirical study is required to provide additional information on the impact of these constructs on consumer innovative behavior. Therefore, Novelty Seeking and Independent Judgment Making are seen as dimensions of PTI and propose the following hypotheses:

H2: Earlier Adopters of MDS have a higher degree of NS than later adopters

H3: Earlier Adopters of MDS have a higher degree of IJM than later adopters

Goldsmith et al (1991) considers this generalized personality trait as global innovativeness and distinguished it from domain specific innovativeness (DSI) that can be applied to a particular service category.

3.2.3 Mobile Services Innovativeness

The first important study on Domain-Specific Innovativeness seems to be the Goldsmith and Hofacker (1991) study which defined DSI as ‘‘tendency to learn about and adopt innovations (new products) within a specific domain of interest.’’ They perceived DSI to be somewhere between PTI and Innovative Behavior (Roehrich, 2004). Whilst PTI considers the general traits of an individual and IB focuses on the individual’s innovative behavior, DSI applies to specific product category. This dimension of innovativeness assumes that the propensity to innovate is a behavioral response to a specific context, which is for the most part determined by an individual’s interest, experience, exposure, and knowledge of a product category (Vishwanath, 2005). The information seeking desire and hence innovativeness of an individual may be better linked to a particular area (domain)

of interest. Since 1991, the DSI has been applied across different domains. Citrin et al. (2000) and Goldsmith (2002) applied it to online shopping and concluded that domain-specific innovativeness mediates the relationship between global innovativeness and online buying; Mowen et al. (2000) also applied it to food and electronic products. Furthermore, Goldsmith et al. (1998) applied DSI to wine and found that DSI positively correlated with consumers' knowledge about the product. Lee et al. (2010) also applied it in the self-service checkout by studying the relationship between demographic variables and technology innovativeness.

Agarwal and Prasad (1998) applied the DSI to information technology in the study of the innovativeness of Internet users and proposed a new construct "Personal Innovativeness" in Information Technology (PIIT), and illustrated its moderating effect on the antecedents of individual perceptions about a new information technology. PIIT was conceptually defined as the willingness of an individual to try out any new information technology. We take the stance that DSI has a higher predictive power than PTI and should correlate with IB better than PTI. We adapt DSI and propose a Mobile Services Innovativeness (MSI) which is defined as "the willingness for an individual to try out a mobile service without any communicational influence" This should score better in predictive validity as it is product category specific (e.g., Goldsmith, 2001). Building on the foregoing, we hypothesis below:

H4: Earlier adopters have a higher degree of MSI than later adopters in the domain of Mobile Money services.

3.2.4 Opinion Leadership

Another concept which has been linked to the innovativeness of consumers is Opinion Leadership. Like leaders in any domain, consumer opinion leaders are individuals to whom others look for information and leadership in making consumption decisions. This concept emerges from the assumption that individuals influence each other through interpersonal communication. Thus, those that exert influence on the purchasing behavior of others are described as opinion leaders. Applying Midgley and Dowling (1993)'s definition of innovators as those individuals who make an adoption decision independently of the opinion of others to the concept of opinion leadership, an inference can be reached that opinion leaders are likely to be early adopters. In Roger (2003), early

adopters are described as opinion leaders. An individual will be described as an opinion leader if he/she influences the purchase decision of other individuals. Such influence can take the form of an advice and verbal direction for the purchase and use; spreading the information through word of mouth; or acting as a role model. Adopting the DSI viewpoint, opinion leaders have an impact on others' attitudes and action towards a specific product or category of products. Tellis et al (2009), in their recent study of Global Consumer Innovativeness found that opinion leadership was very significant in predicting IB. Based on the above, the following hypothesis is formulated:

H5: Opinion Leadership will have a positive and significant relationship with Innovative Behavior.

4. METHODOLOGY

The aim of this study is to investigate the key characteristics of earlier and later adopters of a technological innovation. Using Roger's typology and generalization of innovativeness as the basis, this study explores the individual characteristics of the early and late adopters of the Mobile Money services introduced by Zain in Ghana. Also, by applying Roger's operationalisation of innovativeness as time of adoption, we considered the first 2000 users of the mobile money services as earlier adopters and the rest of Zain's customer database as later adopters. In developing the model we reviewed existing literature on consumer innovativeness and interviewed a number of users of mobile money services. A survey instrument was adopted for this study.

To ensure adequate reliability and validity of the measurement scale used in the study, the instruments used to operationalize the constructs were developed by adapting existing ones validated by other researchers in consumer innovativeness literature. The novelty seeking and independent judgment making were operationalized by seven and six items, respectively. These items were adapted from the work of Manning et al. (1995) in which the measures were found to have high reliability. However, we used a five Likert scale instead of 7 in Manning et al. A second group of innovation-oriented scales are those at a domain-specific level with items only taking into account new products in a specific product category. The Mobile Service Innovativeness construct was operationalised using the four-item of Agarwal and Prasad (1998) PIIT Scale. We applied exactly the same items as those used by Agarwal and Prasad (1998) except that the term "mobile services" replaced the "information technology" term in Agarwal and Prasad's items. Opinion

leadership was measured by six items adapted from Flynn et al. (1996). They developed and tested the scale in a series of five studies and found it to have high reliability and formed a unidimensional measure over a specific product domain. Each item was measured on a five-point Likert scale, with answers ranging from ‘‘strongly disagree” to ‘‘strongly agree”. A single categorical variable (ZAP_use) was used to operationalise innovative behavior in the first part of the analysis. However, a new independent variable measured by an innovate_behavior scale computed from two dichotomous variables: *“Have you ever used Zain’s mobile money services (ZAP)?”* and *“if no, do you intend to use it in the near future?”* was employed in the structural equation model.

A preliminary questionnaire was developed and pilot-tested on students to assess logical consistencies, ease of understanding, the sequence of questions, and task relevance. This resulted in a decision to make some modifications to the original questionnaire to clarify the meaning of certain questions. None of the responses in the pilot test were used in the analysis.

4.1 DATA COLLECTION

Data was collected using both telephone interviewing technique and by a self administered questionnaire at malls and other places. A list of current users of MNO’s mobile money services was obtained and random phone calls were made to them. A total of 500 users from the customer database were called and 372 agreed to participate in the study. Also, 400 questionnaires were distributed at various places within Accra and Kumasi (major citites in Ghana) and a total of 298 responses were received. To avoid double counting, only non users of the mobile money services were included in the face to face survey. In all, a total of 644 responses were included in the study.

4.2 THE MEASUREMENT MODEL

The validity of the measurement model is evaluated by investigating reliability, convergent validity, and discriminant validity. The variables were first evaluated for reliability which assesses the internal consistency of the construct items (Nunnally 1978) using Cronbach alpha. The coefficient alpha estimate of .908 for NS and .904 for IJM were consistent with Manning et al (1995)’s of .87 and .92 respectively. Also, the MSI construct recorded a coefficient alpha estimate of .901 compared to the original scale from Agarwal and Prasad (1998)’s PIIT which was .84. The internal consistency of the Opinion Leadership scale in this study was consistent with that of Flynn et al

(1996) at .832 compared with .87 in their study. However, the coefficient alpha estimate of the cosmopoliteness construct was below the recommended value for social science studies of .70 (Nunnally, 1978) at .58. It was observed that there was no single item that when deleted could bring the coefficient alpha estimate to an acceptable level of .70, therefore the construct was removed from further analysis.

This study used structural equation model for the hypothesis testing. Following Anderson and Gerbing (1988)'s two step approach, first, a confirmatory factor analysis (CFA) measurement model was created to check the model fit and convergent validity of each construct in the proposed model. The CFA specifically, relies on several statistical tests to determine the adequacy of the model fit to the data. The measures used to assess model fit include Chi square, degree of freedom, the X2/df ratio, Normed Fit Index (NFI), Tucker-Lewis Index (TLI, equivalent to Non-Normed Fit Index), Comparative Fit Index (CFI), Root Mean Square Residual (RMSR), and Root Mean Square Error of Approximation (RMSEA).

The purpose of the convergent validity is to ensure unidimensionality of the multiple-item constructs and to eliminate unreliable items (Bollen, 1989). Convergent validity is established by all items loading strongly and significantly on their respective factors and each average variance extracted (AVE) for each latent variable exceeding 0.50 (Fornell & Larker, 1981). Second, the best fit for the data was identified, and the hypotheses were tested between constructs using this model.

5. ANALYSIS AND RESULTS

This section presents the results of the current study. First a descriptive statistics between early adopters and later adopters are presented. Second, an independent samples t-test is conducted to compare the relative importance of the factors and the demographic variables on consumer innovative behavior. Finally, we examine the effect of consumer's Opinion Leadership, Novelty Seeking and Independent Judgment Making and Mobile Services Innovativeness on Innovative Behavior using Structured Equation Model.

5.1 THE PROFILE OF EARLY AND LATER ADOPTERS

Table 2 provides the results of the demographic profile of our respondents and the chi-square between the demographic variables and the innovative behavior variable. In general, a total of 644 respondents made up of 355 early adopters and 289 later adopters were used in the analysis. However, some of the variables had missing responses as reflected in the table. Note that the term "early adopters" referred to respondents who claimed to have used the mobile money services and "later adopters" referred to those who have not used the service.

Table 2: Demographic Profile of Sample

	Early Adopters		Later Adopters		
Demographic	**Count**	**%**	**Count**	**%**	**Chi-square**
Gender					
Male	274	77.4	128	44.3	df=6
Female	80	22.6	161	55.7	chi-square = 470.5
Total	354	100.0	289	100.0	*p= 0.000*
Age Group					
Less than 18 years	12	3.4	14	4.8	
18-25	137	38.7	86	29.8	df=1
26-30	106	29.9	79	27.3	chi-square = 40.8
31-35	64	18.1	53	18.3	*p=0.000*
36-40	19	5.4	29	10.0	
41-50	15	4.2	16	5.5	
51+	1	.3	9	3.1	
Total	354	100.0	286	99.0	
Missing			3	1.0	
Total			289	100.0	
Education					
No Formal	8	2.3	8	2.8	
JHS	46	13.0	55	19.0	df=5
SHS	160	45.2	143	49.5	chi-square = 724.5
University/college	130	36.7	72	24.9	p=0.000
Masters	3	.8	-	-	
Doctorate	4	1.1	4	1.4	
Total	351	99.2	282	97.6	
Missing	3	.8	7	2.4	
Total	354	100.0	289	100.0	

The majority of the respondents were between the ages of 18 and 35 years (i.e 86.7% of early adopters and 76.2% of later adopters) representing 81.9% of the total respondents. This is consistent with prior mobile services and innovativeness related studies (Tobbin, 2010; Gielens and Steenkamp, 2007). The result shows that early adopters of the mobile money services tend to be younger than the later adopters. In terms of education, the majority of the respondents had at

least a secondary school level education with 63.7% (i.e. 58.2% of early adopters and 68.5% of later adopters) having a secondary level education and an additional 32% (i.e. 36.7%of early adopters and 24.9% of later adopters) at the tertiary education level. However, further analysis reveals that whereas 38.6% of the early adopters have at least a tertiary education, only 26% of the later adopters have the same. Moreover, as shown in table 2, the effect of education in the decision to adopt mobile data services earlier was found to be positive but fairly significant at $p<0.05$. Regarding Gender, there was a significant relationship between gender and the innovative behavior of the mobile money services adopters. Whereas early adopters were made up of 77.4% male and 22.6% female, later adopters were 44.3% male and 55.7% female. This finding supports Roger's typology and generalization of innovator and early adopter characteristics. We could therefore conclude that a young graduate level educated male is more likely to be an early adopter of mobile money services in Ghana.

5.2 RELATIVE IMPORTANCE OF CONSTRUCTS ON INNOVATIVE BEHAVIOR

An independent-samples t-test was conducted to compare the mean scores of NS, MSI, IJM and OL constructs for the Early and Late Adopters. The results indicate significant differences between early and later adopters of mobile money services in mean scores on Novelty Seeking, Independent Judgment Making and Opinion Leadership. However, there was no significant difference in scores for early adopters and later adopters for the MSI constructs. However, the NS ($p<0.01$), IJM (0.01) and opinion leadership (0.05) constructs showed significant differences. The negative t-statistic implies that the mean scores for Group 2 (late adopters) are greater than the mean scores for Group 1 (early adopters).

Table 4: Results of the independent samples t-test

Construct	**t-value**	**p-value**
Novelty Seeking	-4.147	0.002***
Opinion Leadership	2.369	0.018**
Independent Judgment Making	-2.684	0.007***
Mobile Service Innovativeness	1.240	0.127

***Significant at the p<0.01

**Significant at the p<0.05

This empirical finding demonstrates that users who adopt mobile money services earlier than others have higher levels of Independent Judgment Making, Novelty Seeking and Opinion Leadership than those who adopt later. These findings are consistent with existing literature on consumer innovativeness.

5.3 STRUCTURAL MODEL RESULTS

5.3.1 Measurement Model

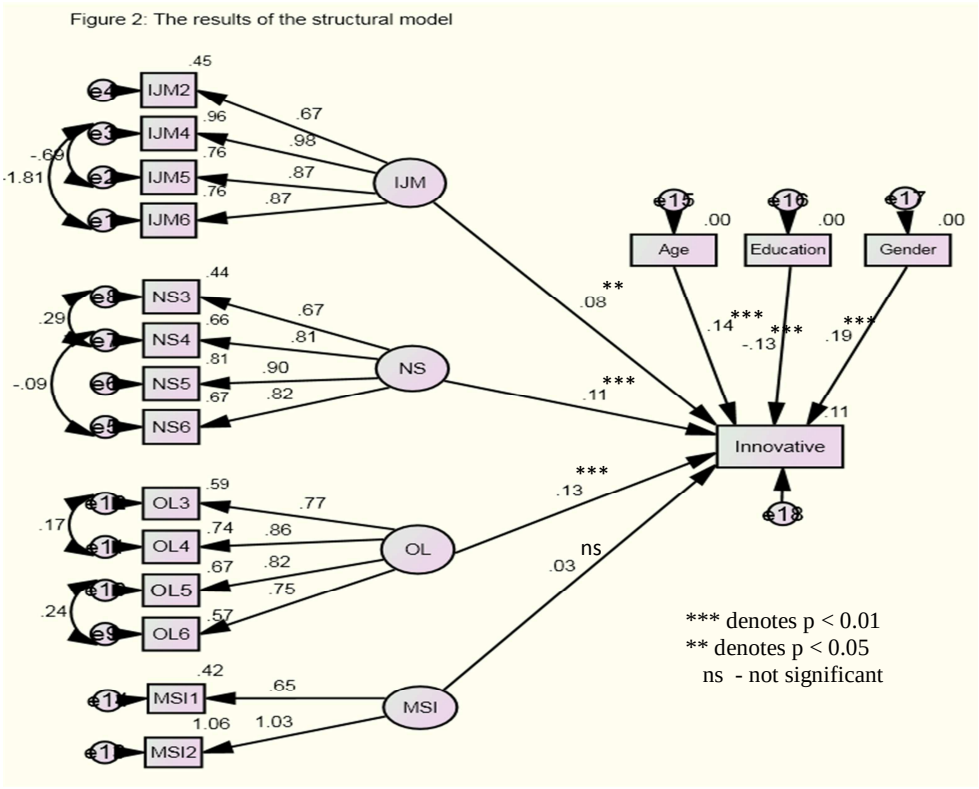
AMOS version 18 was used as the major statistical tool for the structural testing. Following Anderson and Gerbing (1988)'s two staged approach, the first stage examined the convergent validity and the model fit through CFA. The results of the CFA found that not all the items loaded significantly on their respective latent constructs. Using a cutoff of .70 and a significant value $p<0.05$ nine items (NS1, NS2, NS7, IJM1, IJM3, OL1, OL2, MSI1 and MSI2) were removed from the study. After elimination, the value of standardized factor loading for each item to its respective construct was significant ($p < 0.05$), and all loadings ranged from 0.70 to 0.90. The model fit was then examined using maximum-likelihood estimation method. An acceptable model fit is indicated by an RMSEA value of 0.06 or less (Hu and Bentler, 1999). The estimation of the measurement model generated weak model fit with a $x^2/df = 3.961$; $p < 0.05$; RMSEA = 0.069. Using the modifications suggested by AMOS, the co-variances among the observed independent variables were set free and the criteria for good model were met except the significance of the Chi-square (Table 5). However, since the sample size in this study is commonly considered big (>300), the Chi-square value and the related p value are neglected for their over sensitivity to the sample size (Joreskog and Sorbom, 1993).

Table 5: Results of the model goodness-to-fit

Fit Index	Recommended Criteria	Results in this study
Chi-square / degree of freedom	<3	2.357
P value	>0.05	0.000
NFI (Normed fit Index)	>0.90	0.968
CFI (comparative fit index)	>0.90	0.981
TLI (Tucker-Lewis Index)	>0.90	0.975
RMSEA	<0.05	0.046

5.3.2 Structural Model and Hypotheses testing

The structural model to confirm the hypothesized relations among the latent variables was then built and examined. Goodness-of-fit statistics of the structural model were good ($x^2(644)$)= 322.845, p<0.001; x^2/df = 2.522; CFI = 0.962; TLI = 0.949; RMSEA = 0.049.The following figure depicts the statistical results of the path diagram presented above.



All the paths are significant except one. The path coefficient from Mobile Service Innovativeness (MSI) to Innovative Behavior is not significant at the p<0.05 level, thus rejecting H4. The results of the hypotheses testing are summarized in table 6. As expected H1, H2, H3 and H5 were supported in that early adopters and late adopters can be distinguished by their demographic factors, personal traits (including Novelty Seeking and Independent Judgment Making) and Opinion Leadership. However, all together, they accounted for only 11% of the variance in an individual's innovative behavior.

Table 6: Results of the Hypotheses Testing

Hypotheses	Path	Significance (*p-value*)	Standardized (*t-value*)	Results
H1a	Education → Innovative Behavior	0.001	-0.127	supported
H1b	Age → Innovative Behavior	0.000	0.140	supported
H1c	Male → Innovative Behavior	0.000	0.190	supported
H2	NS → Innovative Behavior	0.007	0.111	supported
H3	IJM → Innovative Behavior	0.036	0.079	supported
H4	MSI → Innovative Behavior	0.596	0.034	rejected
H5	OL → Innovative Behavior	0.003	0.129	supported

6. DISCUSSION

The research examines early and late adopters of technological innovations, attempting to uncover their unique characteristics and reveal their motivations. To achieve this, the study analyzed the relationship between personality trait innovativeness, demographic factors and individual's innovative behavior. Identifying early adopters accelerates the diffusion of innovation and minimizes the changes of new product or service failure (Im et al. 2003) and assists organizations to properly target and position the new service. Most research on diffusion of innovation and consumer innovativeness examined situations in Western countries. This study is aimed at validating the Western constructs of innovativeness in an emerging market (Ghana). The results showed support for some part of Roger's characterization of early adopters and provides some empirical evidence for some of his generalizations. Consistent with previous studies arguing that personality trait innovativeness enhances new product / service adoption behavior (Manning et al. 1995), we find that the impact of the two personality traits, innovativeness constructs (Novelty Seeking (β=0.11) and Independent Judgment Making (β=0.08)), on innovative behavior are positive and significant. Thus, the findings indicate that the early adopters of the mobile money innovation in Ghana can be explained partly by their underlying predisposition of innovativeness as conceptualized by Manning et al. (1995). Both the independent-sample t-test and the structural Equation Model showed support for the novelty seeking construct. Consumers with higher propensity and desire to seek out the new and different is conceptually more likely to adopt new products. Individuals with high levels of novelty seeking would be influenced by this characteristic to monitor a wide range of media (e.g. magazines, television programming, newspapers) through

which they may be influenced to use the mobile money services. It also showed a significant correlation to the IB construct. However, the effect size of the difference between the two groups was less than expected, compared to that of opinion leadership. These results have significant implications for promoters of new mobile communication services, in that the use of interpersonal communication through opinion leadership may be a preferred method of communicating a new product in Ghana rather than advertisement in the print media and on the internet.

Opinion Leadership was found to have a significant influence on timing of adoption of mobile money services. This is consistent with previous research on innovativeness (Roger, 2003; Tellis et al, 2009). For example, Goldsmith and Hofacker (1991) reported a significant correlation coefficient between consumer innovativeness and opinion leadership. Early adopters tended to exhibit a higher degree of opinion leadership than later adopters. The opinion leadership of consumers can be linked to a particular product/service category and hence likely to affect the effect on consumer mobile service innovativeness. Although both the IJM and the opinion leadership personality traits were found to have a positive and significant relationship with an individual's innovative behavior when using the SEM, the results were different with the t-test values.

The hypothesized model provides support for a positive path between Novelty Seeking, independent Judgment Making and opinion leadership with innovate behavior variable. Although the variables collectively determine only 11% of the variance in the innovative behavior variable, their significance cannot be overstated. Supporting the common perspective that innovativeness is a product-category (agarwal & Prasad, 1995) phenomenon, we found evidence that mobile service innovativeness has a significant effect on the early adoption process. Individuals who have experience in the use of existing mobile services are more likely to quickly adopt a new mobile data services without any concrete analysis of the utility of the service. In general, the results indicate that the effect of innate innovativeness (independent Judgment and novelty seeking) on innovative behavior is rather small. The demographic variables proved to have greater predictive values and that its significance manifests more in the domain specific innovativeness.

Significant findings of this study rest on the hypothesis that personal characteristics have a stronger and better relationship to an individuals' innovative behavior than their predisposition to adopt

mobile data services. This study has also found that a significant relationship exists between an individual's gender and the timing of their adoption of mobile data services.

7. MANAGERIAL IMPLICATIONS

The importance of early adopters to the financial well-being of organizations with innovative products cannot be overstated (Goldsmith and Flynn, 1992). It is important to know who the early adopters of a mobile data service are so that special marketing efforts can be made to foster their trail and eventual adoption. The income generated by sales to early adopters usually acts has the catalyst for further development and improvement of the product which then leads to the spread of the innovation to the wider community. The results from the present study indicates that early adopters differ from late adopters in a number of unique characteristics including novelty seeking, Independent Judgment Making, age-group, education, and opinion leadership. Since the early adopters of mobile data services are found to be young educated novelty seekers, marketers of mobile money services may want to develop means to find the use of their services. The initial advertisement of mobile money services in Ghana was pitched as a money transfer service for consumers who transfer money from the cities to relatives in the rural areas. However, the results of this study indicate that perhaps a better response may have been obtained if the promotion targeted the young, educated and experience users of existing mobile services.

Also, marketers of mobile money may want to develop means to nurture the mobile services specific innovativeness by providing rewards and other incentives to consumers of existing mobile services. For example, consumers are given extra credit if they use mobile money services to top-up the credit on their phones. Also users of mobile internet are given more downloads if they use mobile money services to pay for the service. These in turn should lead them to undertake more mobile money related services.

Our findings that early adopters have a higher opinion leadership than later adopters and that of independent judgment may lead to some important implications for mobile money marketers in their effort to understand the mobile service consumer and formulating marketing strategies. Targeting opinion leaders in a given community can hasten the diffusion of the innovation. Finally, since opinion leaders tend to have a level of authority in their communities, efforts have to be made to ensure that positive impression is obtained from this group of users.

8. CONCLUSIONS

The findings also provide evidence that domain specific innovativeness (MSI) has a positive significant correlation with innovative behavior. In conclusion, the study identifies novelty seeking, opinion leadership and mobile services innovativeness to be important factors differentiating early adopters from late adopters. Also, several demographic characteristics of mobile users, including gender, age and education, were significant in determining the timing of adoption. From a practitioner's perspective, the findings of this study suggest several indicators for identifying early adopters of new mobile data services. These can help mobile network operators in better allocating their marketing resources and improving the chance of new product success. The following conclusions can be drawn from this study:

- A young graduate level educated male is more likely to be an early adopter of mobile money services in Ghana.
- Mobile data services early adopters can be better segmented using their demographic characteristics than their personality traits.
- Early adopters of mobile money services tend to be those who exhibit a high degree of opinion leadership in Ghana. Marketers of mobile money should target opinion leaders in their communities to facilitate the initial uptake of the service.

As a conclusion, we have found that early consumers do care about the responses from significant members of their society and that they do not take adoption decisions independently of these members in their society.

9. LIMITATIONS AND FURTHER RESEARCH DIRECTION

The study investigated just one single mobile communication service, mobile money. While it was considered appropriate for this study, generalization of the findings should not be encouraged. In addition, the assumption that users who are not currently using the services are late adopters of the service may not be appropriate. Some users may never adopt the service. They may actually be non-adopters of the technology. However, for the purposes of distinguishing earlier adopters from late adopters, this method may be appropriate (Agarwal & Prasad; 1998).

To further research in this area, we outline a number of possible directions. First, most studies on consumer innovativeness take the form of cross sectional quantitative survey based study. A methodological contribution could be gained by undertaking a qualitative study (either focus group discussion or interviews) of early adopters of specific product / service adoption. The personality trait innovativeness (innate innovativeness) sub constructs of novelty seeking and independent judgment making could be correlated to a global innovativeness construct before linking it to the innovative behavior variable. Third, future research could use different behavioral measures to capture new mobile service innovative behavior.

10.APPENDIX A

Questionnaire

Have you ever used the Zain Mobile Money Services (ZAP)? Yes/No

If No, are you likely to use it in the next 12 months? Yes/No

Novelty Seeking – strongly agree – strongly disagree

1. I often seek out information about new technology
2. I like to go to places where I will be exposed to information about new technology
3. I like magazines that introduce new technology
4. I frequently look for new technology
5. I seek out situations in which I will be exposed to new and different sources of new technology
6. I am continually seeking new technology experiences
7. I take advantage of the first available opportunity to find out about new technology

Opinion Leadership

Mobile Service Innovativeness

1. My opinions on hardware/software products seem not to count with other people (e.g. my brothers/sisters, my schoolmates, or my friends)
2. When other people choose to adopt a mobile service, they turn to me for advice
3. Other people's selection of a mobile service is often based on what I have suggested to them
4. I often persuade other people to adopt the mobile services that I like
5. Other people often come to me for advice about choosing a mobile service
6. I often influence other people's opinions about mobile services

Independent Judgment Making

1. Prior to purchasing a new mobile service, I seldom consult my friends that have experiences with the new product
2. When it comes to deciding whether to purchase a new mobile service, I do not rely on experienced friends for advice
3. I seldom ask a friend about his or her experiences with a mobile service before I use the new service
4. I decide to buy new mobile services without relying on the opinions of friends who have already tried them
5. When I am interested in using a new mobile service, I do not rely on my friends that have already used the new product to give me information as to whether I should try it
6. I do not rely on experienced friends for information about new hardware/software products prior to making up my mind about whether or not to purchase

1. I like to experiment with new mobile services.
2. If I heard about a new mobile service, I would look for ways to experiment with it.
3. Among my peers, I am usually the first to try out new mobile services
4. In general, I am hesitant to try out new mobile services

Cosmopolite

I like travelling to other destinations apart from my hometown
I like travelling outside Ghana
I am likely to travel outside my environ within the next 12 months

Demographic Variables

Please specify your age group

18-30; 31-40; 41-45; 46-50; 51-60

Gender Male/Female

Highest level of education: (Please mark the highest level reached)

No Formal Education		Junior High School		Senior High School	
University / College Graduate		Masters		Doctorate	

11.References

Agarwal, R., & Prasad, J. (1998). A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology. 204-215.

Agarwal, R., & Prasad, J. (1998). The antecedents and consequents of user perceptions in Information Technology adoption. *Decision Support Systems* , 15-29.

Anderson, J.C. and Gerbing, D.W. (1988), "Structural equation modeling in practice: a review and recommended two-step approach", Psychological Bulletin, Vol. 103 No. 3, pp. 411-23.

Bartels J, Reinders MJ (2010), Consumer innovativeness and its correlates: A propositional inventory for future research, J

Bartlett, M. S. (1954). A Note on the Multiplying Factors for Various χ2 Approximation. *Journal of the Royal Statistical Society* .

Bass, E M. 1969. A new product growth for model consumer durables. ManagementSci .1 5(5)2 15-227

Bollen, K.A. (1989), *Structural Equations with Latent Variables*, New York: John

Wiley & Sons, Inc.

Brancheau, J. C., & Wetherbe, J. C. (1990). The Adoption of Spreadsheet Software: Testing Innovation Diffusion Theory in the Context of End-User Computing. pp. 115-143.

Burkhardt, M. E., & Brass, D. J. (1990). Potential Power and Power Use: An Investigation of Structure and Behavior. 441-470.

Chau, P. Y., & Hui, K. L. (1998). Identifying early adopters of new IT products: A case of Windows 95. *Information & Management* , 225-230.

Chen, L.-d. (2008). A model of consumer acceptance of mobile payment.

Cheng, T. E., Lam, D. Y., & Yeung, A. C. (2006). *Adoption of internet banking: An empirical study in Hong Kong.*

Chia, S.C., Li, H., Detenber, B., & Lee, W. (2006). Mining the internet plateau: An exploration of the adoption intention of non-users in Singapore. New Media & Society, 8(4), 589–609.

Citrin AV, Sprott DE, Silverman SN, Stem Jr DE. Adoption of internet shopping: the role of consumer innovativeness. Ind Manage Data Syst 2000;100(7):294–300.

Davis, F., Bagozzi, R., Warshaw, P., (1989): User Acceptance of Computer Technology: A Comparison of Two Theoretical Models, Management Science Vol. 37, No. 8, pp. 982 - 1002.

Dolan J. (2009) Accelerating the Development of Mobile Money Ecosystems. Mobile Money Summit 2009

Droge, C., Stanko, M. A., & Pollitte, W. A. (2009). Lead Users and Early Adopters on the Web: The Role of New Technology Product Blogs. *Product Development & Management Association*, (pp. 66–82).

Erosa, V. E. (2009). Technology Illiteracy in Retail SMEs: Exploring Late Adopters Characteristics. *PICMET* , pp. 2623-2630.

Faxall, G. R. (1994). "Consumer psychology and behaviour analysis. Journal of Economic Psychology, 14, 5-91.

Flynn LR, Goldsmith RE. A validation of the Goldsmith and Hofacker innovativeness scale. Educ Psychol Meas 1993;53:1105–16.

Flynn, Leisa R., Ronald.E. Goldsmith and Jacqualine K. Eastman (1996), "Opinion Leaders and Opinion Seekers: Two New Measurement Scales," Journal of the Academy of Marketing Science, 24 (2), 137-147.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *48*, 39–50.

Gielens K, Steenkamp JBEM. Drivers of consumer acceptance of new packaged goods: an investigation across products and countries. Int J Res Mark 2007;24(2):97-111.

Goldsmith RE, Hofacker CF. Measuring consumer innovativeness. J Acad Mark Sci 1991;19:209–21.

Goldsmith, R. E., & Flynn, L. R. (1992). Theory and measurement of consumer innovativeness: A transnational evaluation.

Gunnar Cramner and Emil Sjoblom. (2009, July) Can the success of M-PESA be repeated? A review of implementations in Kenya and Tanzania. Value Bits note.

Ha, Y. and Stoel, L. (2004), "Internet apparel shopping behaviors: the influence of general innovativeness", International Journal of Retail & Distribution Management, Vol. 32 No. 8,

Hirschman EC (1980). Innovativeness, novelty seeking, and consumer creativity. J Consum Res 1980;7 (3):283–95.

Hu & Bentler (1999). Cutoff criteria for fit indexes in covariance structure analysis: Coventional criteria versus new alternatives, *Structural Equation Modeling, 6*(1), 1-55.

Hughes, N. & Lonie, S. (2007) "M-PESA:Mobile Money for the "Unbanked" Turning Cellphones into 24-Hour Tellers in Kenya". Innovations: Technology, Governance, Globalization 2(winter & spring edition), 63-81.

Im, S., Bayus, B. L., & Mason, C. H. (2003). An Empirical Study of Innate Consumer Innovativeness, Personal Characteristics and New-Product Adoption Behavior. Journal of the Academy of Marketing Science, 31(1), 61-73.

Ivatury, Gautam and Mas, Ignacio. (2008). "The Early Experience with Branchless Banking". Focus Note No. 46. Washington, D.C.: CGAP.

J. C. Mowen, The 3M Model of Motivation and Personality: Theory and Empirical Applications to Consumer Behavior (New York, Kluwer Academic Press, 2000);

Jenkins, Beth. 2008. "Developing Mobile Money Ecosystems." Washington, D.C.: IFC and the Harvard Kennedy School. http://www.hks.harvard.edu/mrcbg/CSRI/publications/report_30_MOBILEMONEY.pdf.

Kauffman, R. J., & Techatassanasoontorn, A. A. (2009). Understanding early diffusion of digital wireless phones. *Telecommunication Policy* , 432-450.

Lee, H., Ryu, J., & KimHyunjoo, D. (2010). Profiling mobile TV adopters in college student populations of Korea. *Technological Forecast and Social Change* , 514-523.

Lu, J., Yao, J. E., & Yu, C.-S. (2005). Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology. *Journal of Strategic Information Systems* , 245–268.

Mahajan, V., Muller, E., & Srivastav, R. K. (1990). Determination of Adopter Categories by Using Innovation Diffusion Models. *Journal of Marketing Research* , 37-50.

Manning KC, Bearden WO, Madden TJ. Consumer innovativeness and the adoption process. J Consum Psychol 1995;4(4):329–45.

Mante-Meijer, E., & Haddon, L. (2001). Checking it out with the people–ICT markets and users in Europe.

Market Introduction of Mobile Internet Services: Innovative Performance in Japan and Europe.

Mas, I., & Radcliffe, D. (2010). Scaling Mobile Money

McDonald, H., & Alpert, F. (2007). Are Innovators Worth Identifying?

McDonald, H., & Alpert, F. (2007). who are "innovators" and do they matter? *Marketing Intelligence & Planning* , 421-435.

Meuter, M. L., & Curran, J. M. (2005). Self-service technology adoption: comparing three technologies. *Journal of Services Marketing* .

Midgley, D. F., & Dowling, G. R. (1978). Innovativeness: the concept and its measurements . *Chicago Journal* , 229-242.

Mobile Technology Adoption for Mobile Information Systems. (2005). *Proceedings of the International Conference on Mobile Business*, (pp. 1 - 4).

Moore, G. C., & Benbasat, I. (1991). Development of an Insturment to Measure the Perceptions of Adopting an Information Technology Innovations.

Nabih, M.I., Bloem, S.G. and Poiesz, T.B.C. (1997), "Conceptual issues in the study of innovation adoption behaviour", Advances in Consumer Research, Vol. 24, pp. 190-6.

Nunnally, J. (1978).

Parka, S., & Yoonb, S.-H. (2005). Separating early-adopters from the majority: The case of Broadband Internet access in Korea. *Technological Forecasting and Social Change* , 301=325.

Pedersen, P. E. (2005). Adoption of mobile Internet services: An exploratory study of mobile commerce early adopters. *Journal of Organizational Computing and Electronic Commerce* , 203 - 222. pp. 377-85.

Rijnsoever, F. J., & Donders, R. T. (2009). The Effect of Innovativeness on Different Levels of Technology Adoption. *Journal Of The American Society For Information Science And Technology* , 984–996.

Roehrich, G. (2004). Consumer Innovativeness Concepts and Measurements. *Journal of Business Research* , 671-677.

Rogers, E. (1983). *Diffusion of Innovation.* New York: Free Press.

Rogers, E. (2003). *Diffusion of Innovation.* Free Press.

Steenkamp, J.-B. E. (1999). The role of national culture in international marketing research.

Steenkamp, Jan-Benedict E.M., Frenkel Ter Hofstede, and Michel Wedel (1999), "A Cross-National Investigation into the Individual and National Cultural Antecedents of Consumer," Journal of Marketing, 63 (April), 55–69.

Tellis, G. J., Prabhu, J. C., & Chandy, R. K. (2009). Radical Innovation Across Nations: The Preeminence of Corporate Culture.

Tjøstheim, I., & Boge, K. (2001). Mobile Commerce - Who Are The Potential Customers.

Tobbin, P. (2010) Modeling the adoption of Mobile Money Transfer: A Consumer Behaviour Analysis. Proceedings from M4D Conference, Kampala

Van den Bulte, C. (2000). New product diffusion acceleration: Measurement and analysis. Marketing Science, 19(4), 366–380.

Venkatesh, V. (2003). User Acceptance Of Information Technology Towards A Unified View.

Venkatraman, M. P. (1991). "The Impact of Innovativeness and Innovation type on Adoption.

Vishwanath, A. (2005). Impact of Personality on Technology Adoption: An Empirical Model. *JOURNAL Of The American Society For Information Science And Technology* , 803-811.

Wei, R., 2001. From luxury to utility: a longitudinal analysis of mobile phone laggards. Journalism and Mass Communication Quarterly 78 (4), 702–719.

Yi, M. Y., Fiedler, K. D., & Park, J. S. (2006). Understanding the Role of Individual Innovativeness in the Acceptance of IT-Based Innovations: Comparative Analysis of Models and Measures. *Decision Sciences , 37 Number 3*, 393-426.

Understanding Mobile Money Ecosystem: Roles, Structure and Strategies

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***Abstract* -** The paper discusses the structure of the new mobile money ecosystem and the roles of its key players. Mobile money is an evolving phenomenon in volume as well as in economic impact especially in the developing world. The paper is an exploratory examination of the structure of the ecosystem, providing a foundation for future strategic analysis of the system. The paper adopts its theoretical insight from Moore's business ecosystem theory to explain the key roles of the actors in the mobile money ecosystem. It also draws extensively on the work of Iansiti and Levien to explain the strategies of the players in the system. It is argued that to ensure sustained robustness and productivity, Mobile Network Operators (MNOs) aim at adopting a keystone strategy in the system, which implies refraining from being dominators and encouraging new niches in the area of m-commerce applications.

Keywords: business ecosystem; keystone strategy; mobile money; mobile payments; mobile money transfer

1. Introduction

Mobile money is a 'transformational' mobile data service facilitating access of the unbanked to financial services (Porteous, 2006). The mobile money phenomenon is spreading throughout the emerging economies at an unprecedented rate. During the past decade, mobile money has expanded to over 32 countries in the developing world (Mas and Radcliffe, 2010). It is, therefore, topical to discuss the emerging mobile money ecosystem, its structure, and the roles for the key players in the system.

The main question to be answered is how the structure of the mobile money system is evolving and what strategies its key players are adopting to ensure sustained robustness and productivity for all? Linked to this question, the paper discusses the nature of the mobile money business, the incentives and the roles of its key players drawing from the work of Iansiti and Levien (2004a). Mobile money as a business ecosystem depends on the interconnectedness of the consumers, mobile network operators, banks, agents, merchants and the regulators being the key players in the system. The health of the ecosystem determines the health of the individual parts within the ecosystem and vice versa.

Drawing extensively on the work of Iansiti and Levien (2004a), the study applies the business ecosystem principles to analyze the strategies that the key members are adopting with respect to their roles in the system to ensure sustained robustness and productivity in the ecosystem. Applying the development of M-PESA by Safaricom in Kenya as a case study, the paper analyzes the implications of an MNO adopting either a dominator strategy or a keystone strategy. It identifies the activities of the MNO, which are skewed towards a hub landlord strategy and those, which constitute a keystone strategy (Iansiti and Levien, 2004a). It is argued that considering the role of the MNOs in both the MNO-led and bank-led implementations, the mobile money ecosystems seem to be healthier if the MNOs adopt a keystone strategy. It is also concluded that an MNO-led mobile money business model is more likely to succeed than a bank-led business model. These results have implication for both policy makers and practitioners in the further development of the mobile money ecosystem. For the rest of the paper, there is first a presentation of the background followed by the theoretical framework, the mobile money ecosystem, the mobile money structure, and an analysis of the ecosystem leading to the final conclusions.

2. Background

Two of the key roles of money are: as a store of value and a means of exchange. Most of the emerging markets operate a cash economy with over 70% unbanked (Jenkins, 2008). The ability of mobile phones to store value and be used as a means of exchange, coupled with their huge penetration levels, presents an opportunity to reach the highest number of unbanked people in the developing world (Dahlberg et al., 2008).

Fundamental to the concept of mobile money is bringing financial services to the unbanked. The phrase 'banking the unbanked' is what differentiates mobile money from the traditional concepts of mobile payment and mobile banking. Additionally, the traditional mobile payment system falls short of person-to-person money transfer, which has become the hallmark of mobile money. In an attempt to distinguish the traditional m-payment from the 'transformational' mobile money phenomenon, Porteous (2006) emphasized that an application is transformational if it targets the section of the population that is currently unbanked. Therefore, the proposition is that the definition will only be complete when this unique characteristic is included, redefining mobile money as the use of mobile phones to deliver financial services to the unbanked. In general, mobile money services include 1) person-to-person transfer of funds such as domestic and international remittances, 2) person-to-business payments for the purchase of a range of goods and services, and 3) mobile banking through which customers can access their bank accounts, pay bills, or deposit and withdraw funds (Donner, 2008). These services have the ability of turning a mobile device into a business tool, substituting or complementing banks, ATMs and credit cards (Venkatesh, 2003).

Mobile money as a phenomenon of interest is contemporary and scarcely researched. Current research in this area is dominated by studies from the development/practitioner literature (Ivatury and Pickens, 2006; Porteous, 2006; Donner, 2008; Merritt, 2010). However, since the launch of SMART Money in the Philippines in 2003, at least 72 mobile money deployments have been launched across 42 developing countries. The year 2010 alone saw 31 new mobile money deployments in 25 countries (Mas and Radcliffe, 2010). So far, the most successful deployment of mobile money is Safaricom's M-PESA in Kenya. Since its launch in March 2007, it has been adopted by 11.7m customers (corresponding to 54% of Kenya's adult population and 73% of Safaricom's subscriber base) and processes more transactions domestically than Western Union does globally. US $415 million per month is transacted in person-to-person transfers, equal to 17% of Kenya's 2009

GDP on an annualized basis (Mas and Radcliffe, 2010). However, similar implementations in other countries (Tanzania, Ghana and Uganda) have not enjoyed the same level of popularity and success. This calls for an investigation into the key determinants of the adoption and use of mobile money to assist future development of its applications.

3. Theoretical Framework

The term ecosystem has its roots in biology where it is defined by the New Oxford Dictionary (1993) as 'a system of organisms occupying a habitat, together with those aspects of the physical environment with which they interact'. The concept of business ecosystem was developed from this biological ecosystem perspective coupled with the study of business networks. The terminology business ecosystem was initially used by Moore (1993). Moore defined a business ecosystem as 'an economic community supported by a foundation of interacting organizations and individuals – the organisms of the business world' (Moore, 1996). The economic community in a business ecosystem is made up of the suppliers, customers, partners, competitors and other stakeholders. Moore (1996) regards the business ecosystem concept as a medium to understand how an economic community works and argues that the term business ecosystem should replace industry and that companies should be considered not as members of a single industry but as part of an ecosystem. Through the lens of the business ecosystem concept, one puts focus on the interconnectedness of the various actors and the fact that they depend on each other for survival (Peltoniemi, 2005).

Over the last few decades, extended ecosystem analogies have been created. Notable among them are the industrial ecosystem, presented by Frosch and Gallapoulos (1989); economy as an ecosystem, presented by Roehrich (2004); social ecosystem, proposed by Midleton-Kelly (2003). Central to all these analogies is the fact that an ecosystem is characterized by a large number of loosely interconnected participants who depend on each other for the mutual effectiveness and survival (Iansiti and Levien, 2004a) and that the species in the ecosystem share their fate together. Furthermore, a key characteristic of an ecosystem is its ability to continuously evolve and adapt to changes in its environment.

Iansiti and Levien (2004b) extended the business ecosystem concept and defined it as a business network which is formed by large loosely connected networks of entities that interact with each other in complex ways. The entities form groups of participants connected closely as 'hubs', which can impact on the health of an entire network, and within larger networks, these 'hubs' are referred

to as ‘keystones’. Like Moore (1993), Iansiti and Levien (2004b) argued that no firm can work in isolation and that the health and performance of a firm is dependent on the health and performance of the whole business community. They went further to develop metrics for the measurement of the health of ecosystems and they proposed robustness, productivity and niche creation as key elements. Furthermore, they developed innovation and operation strategies that a firm can adopt depending on its role in the ecosystem (Hartigh and Asseldonk, 2004). They introduced three different roles that organizations can take in business ecosystems:

Keystones are the kinds of companies which serve as the enablers and which have a great impact on the whole system. Unlike dominators, they do not try to control the network. Instead, they facilitate access to resources, which provides them with an opportunity to benefit from the other actors. They adopt a platform strategy. The keystones play a structuring role within their ecosystems in terms of value creation and value sharing (Iansiti and Levien, 2004b). They should, therefore, be aware of the impact of their activities of the members of their ecosystems and align their interest with the overall interest of the rest of the community.

Niche players, on the other hand, are smaller organizations who make up the largest mass of the business ecosystems but specialize in specific areas. They access the resources made available by the keystones through their platforms to create value in the ecosystem through their specialized capabilities (Isckia, 2009). They provide input to new innovations and further development of the keystones’ platforms. Real innovations within an ecosystem are derived from the niche players’ quest for finding a specialized place within the community. The survival of the niche players depends on the keystones’ platforms which in turn depend on the niche players.

Dominators and hub landlords are the kinds of organizations, which attract resources from the system but do not function reciprocally. The dominators are referred to as the physical dominators and the hub landlords are the value dominators (Isckia, 2009). They control the other species in their ecosystem and seek to take over through vertical integration.

The complexity and turbulence of an ecosystem would determine the most appropriate roles and the relevant matching strategies. In a frequently changing or developing environment, the keystone and niche player roles are recommended (Iansiti and Levien, 2004a). By adopting this role, the niche player can focus on a narrowly and clearly defined business segment with specialized capabilities. The keystones can also focus on managing the widely distributed assets on which the entire

ecosystem depends. Dominators and hub landlords can exist in a mature ecosystem, which relies on a complex network of external assets. Their focus will be to extract maximum value in the short term and become their own ecosystem. Dominators destroy their ecosystem in the long term.

The key to value creation in a business ecosystem lies in understanding how value is created in relationships. These relationships are connected and multidimensional, thus the actions of a species can affect multiple species within the ecosystem. By understanding the underlying relationships between the actors of an ecosystem, we can better understand the following:

- Where value lies in the network and how value is co-created
- How the firm's activities will affect the network, and
- How other members are likely to respond

4. Mobile Money Ecosystem

Extending the business ecosystem to the mobile money environment, this study suggests that there are a number of key players in the mobile money ecosystem – including but not limited to consumers, Mobile Network Operators (MNOs), banks, agents, merchants, competitors and regulators. They share a common fate in the ecosystem.

Mobile Network Operator

The MNOs come into the mobile money ecosystem with assets and capabilities. First they bring the infrastructure, including wireless communication, back-end m-commerce server and application facilities, and the mobile device application. Secondly, MNOs bring into the ecosystem their huge existing distribution channel used for the sale of subscriptions and prepaid credits. These channels are normally more far reaching than the branches of the financial institutions. Wherever there is mobile coverage, there is an agent of a distributor who sells the relevant prepaid cards. The MNOs have the capability of attracting the unbanked through branding. MNOs like MTN, Vodafone and Celtel have created major brands throughout Africa and beyond. Good brands create consumer trust, which is required in any payment system especially when it is electronic. As posited by Jenkins (2008), the ability for MNOs to reach customers across all income segments is what gives them the impetus to be key players in the mobile money ecosystem. Usually the customers in a mobile money ecosystem belong to the mobile network operator. It provides customer service facilities to the customers and training for the agents in dealing with the customers.

Mobile money provides an attractive proposition for MNOs to achieve a return on the investments made in infrastructure over the past decades through management of churn, extra payments, and through associated increases in air time and data use. It also reduces the airtime distribution cost as well as meeting service obligations. Mobile money, moreover, holds the possibility of allowing for the diversification into other areas of the consumers' needs and lifestyles.

Financial Institutions (Banks)

Payment systems and mechanisms to store value are primary functions of financial institutions. Financial institutions, therefore, come into the mobile ecosystem with their vast experience and customer trust in dealing with money. They provide the banking license and store the mobile money customers' deposits in trust accounts. The branch offices of the banks act as aggregation points for the merchants and distribution channels and their agents. In most implementations, the banks act as the intermediary between the MNOs and the agents in acquiring the e-value. Where merchants are involved, the banks provide a link to the existing merchant accounts to facilitate the flow of money from its e-float account to its main account. They also provide online banking integration to the m-commerce system of the MNOs to facilitate their operations. They are usually the only institutions mandated to deal with cross border financial transactions (foreign remittances) and settlements. They provide financial regulatory advice to the MNOs.

Mobile money has the capability of significantly reducing the cost of providing financial services to customers whilst increasing the customer base. It will broaden the spread of the banks and hence help fulfill their service ambitions. Mobile money provides a cheaper means to deposit mobilization than the traditional methods used by banks. Additional revenue could be generated from the deposits obtained though mobile money.

Distribution Channels (Agents)

The distribution channels through their agents act as the primary contact with the customers. These are non-bank entities such as retailers (either the MNO's own retail center or another retailer such as a village store) that handle customer registration and the cash-in/cash-out services on behalf of the MNO. They contribute through their knowledge and understanding of the customers and their needs to further develop the mobile money services. Traditionally, the MNOs were expected to use their distribution channels, which resell airtime, as the main agents of mobile money. However, in

most current implementations, the agents have extended to general retailers especially in the rural areas. The agents naturally become branches of the MNOs. The key to choosing an agent lies in the retailer's liquidity. They tend to have sufficient liquidity from other business activities to satisfy customers' needs to withdraw cash.

The agents earn commission for mobile money services rendered. Although these are usually very small amounts per transaction, it is expected that the volume of transactions will add up to a good amount. Agents who are existing retailers usually obtain an additional benefit of reducing their risk of carrying huge cash to the bank.

Merchants & Utilities

The merchants and utility providers offer an additional reason to adopt and use the mobile money services. Merchants include retail shops, online shops, casinos, lotteries, and general goods and services providers who adopt the mobile money platform as a means to receive payments from customers. For example, both M-PESA in Kenya and ZAP in Ghana are used for the payment of the most popular pay-per-view TV service in Africa (DSTV). Customers of the merchant buy e-value from an agent and use it to pay the merchant by transferring the e-value to the merchant's account. Instead of spending hours in queues to pay utility providers, mobile money affords customers the ability to make payments using the e-value on their mobile phone. This provides convenience, speed and security to the merchant and its customers. The availability of merchants and utility providers increases the customer base of the mobile money ecosystem and, thereby, acts as a catalyst in promoting the services.

Thus, the use of mobile money will reduce the cost of payment collection and processing. It will also increase timeliness of payment and offer greater customer convenience. These advantages can lead to an increase in the customer base for the merchants.

Regulators

The role of regulators in the mobile money ecosystem is critical for its long term survival. They potentially bring experience and understanding of the various industries involved in this ecosystem. When fulfilling their role and obligations, they work to provide a balance between innovation, value creation, efficiency, financial inclusion and prudence through the imposition of regulations. They can enforce compliance to the various regulations. Furthermore, they can play a refereeing role

between competing parties. Their activities cover all the other members of the mobile money ecosystem.

The Customers

The customers bring their diverse needs as opportunities to the mobile money ecosystem. Customers are the final recipients of a mobile money service. The success or failure of the ecosystem depends on customer behavior towards the mobile money services. It is, therefore, imperative that customer needs are met by mobile money services and that they have good experience with the services. Mobile money reduces the risk of carrying cash and increased access and affordability of payment, remittance and other financial services.

5. The Structure of Mobile Money

As posited by Jenkins (2008), there is no limit to the range of transactions and services that mobile money could eventually be used for. The structure of the mobile money ecosystem is still evolving and may include far more services in the future. However, at the time of writing most mobile money implementations follow the structure shown in Fig. 1. A typical mobile money implementation involves mobile money transfer and mobile payment. Airtime top-up is considered as a mobile payment. Since the success of Safaricom's M-PESA, most implementations start with aspects of mobile money transfer (person-to-person money transfer), airtime purchases and then person-to-business, and finally the mobile banking aspects.

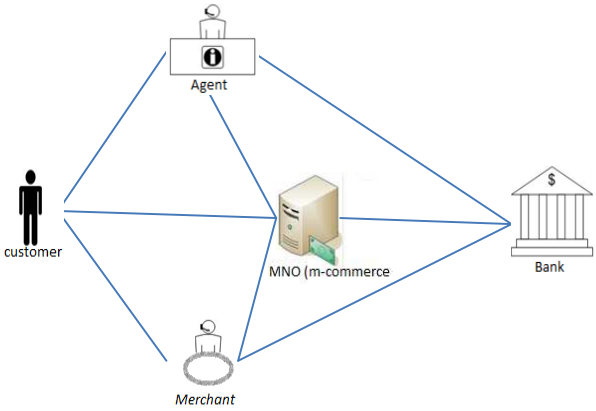

Figure 1: The Mobile Money Structure

6. Mobile Money Transfer

Mobile money transfer is defined as a transfer of money between two parties through the use of mobile devices (Bourreau and Verdier, 2010). It includes both local and foreign remittances and excludes transfer between person-to-business and business-to-business, since these usually involve the purchase of some kind of goods and/or services. Mobile-enabled person-to-person transfer of money is the bedrock of the mobile money phenomenon. Venkatesh (2003) identified the mobile money transfer application as the most important application for mobile commerce. This has proven to be so in the case of Safaricom's M-PESA in Kenya, where more than half of the adult population is using the service (Mas and Radcliffe, 2010).

A mobile money transfer includes both domestic and foreign (international) remittance. The domestic remittance services are primarily targeted at the urban migrant population who seek greener pastures and send money regularly to rural kin. These are mostly husbands remitting to wife and children or children remitting to parents. There are also remittances between siblings and extended family members in some cases. In Kenya and Tanzania about 17% and 28% respectively of households depend on remittances as their primary source of income (Pulver, 2009). Mobile money through mobile money transfer mechanisms provide a secure, relatively cheap and convenient domestic and foreign remittance service to the poor and rural people in the developing world. At the time of writing, the Agricultural Development Bank of Ghana provides remittance services for the first 100 USD with a 5 USD fee, compared to the MTN or ZAP mobile money services, which charge approximately 25 cents on the first 100 USD. Also, a recent Western Union-linked Trumpet Mobile large-scale international money transfer operation serving the US and the Latin American corridor led to cheaper fees than the traditional Western Union charges (Yujuico, 2009). The mobile money transfer process irrespective of being domestic or foreign will be about the same from the customer perspective.

A mobile money transfer will usually involve 4 steps: registration, cash-in, transfer, and cash-out. A onetime registration process (1) is required before a user can use any of the mobile money services. A customer visits an agent and fills in an application form. The agent verifies the customer's ID (either a national ID, driving license etc.) and then uses his phone to temporarily register the customer on the MNO's m-commerce server. The m-commerce server creates an account on the m-commerce server and a mobile wallet and sends an SMS confirmation to the customer. The

application form with the verification proof is sent to the MNO who then establishes the mobile wallet. The cash-in process (2) involves the purchasing of electronic money (e-value) into the m-wallet. The customer visits an agent and pays for a specific amount of e-value. The agent transfers the e-value from his/her special SIM mobile phone to the customer through the m-commerce server. And, an encrypted SMS is sent from the agent's mobile phone to the m-commerce server requesting for the transfer to be drawn between the two accounts. An encrypted SMS is then sent to the customer to confirm the transaction.

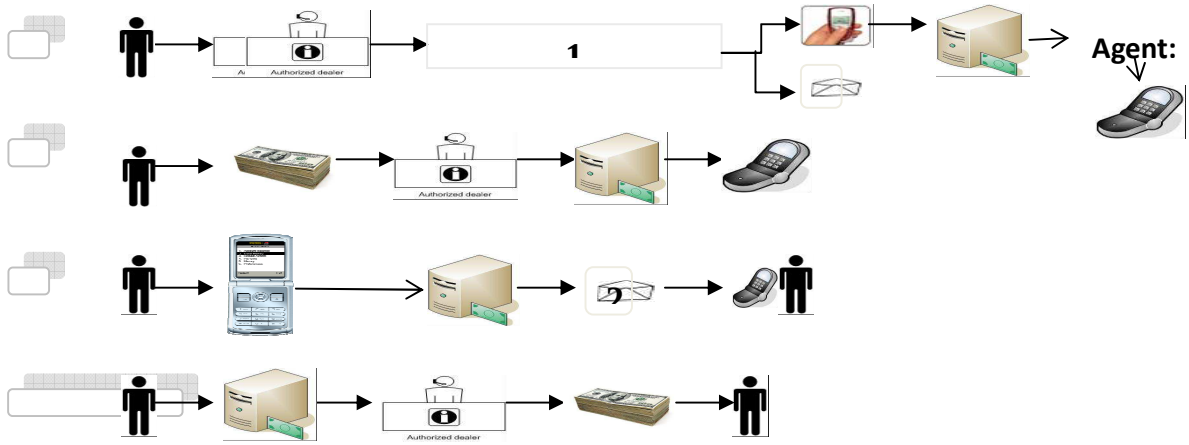

Figure 2: Mobile Money Transfer Process

The next step is the actual transfer stage (3). This is usually done through the customer interface on a basic model phone. To select the best method, which provides a compromise between usability, security and costs, most implementations use a menu driven access by the SIM toolkit, which is the standard software on all mobile phones (Hughes and Lonie, 2007). The customer using the menu on the SIM transfers the e-value from his/her phone to the recipient's mobile wallet. This involves an encrypted SMS to the m-commerce server from the sender with an instruction to transfer the specified amount to the recipient. After verification and availability of funds checks, the m-commerce server actions the instructions by debiting the sender's account with the amount and any fees charged (where applicable) and crediting the recipient. A confirmation through an encrypted SMS is sent to both the sender and the recipient. Most mobile money implementations to date use either SIM Toolkit (STK) or its equivalent USIM (Universal Subscriber Identity Module) application toolkit as the technology platform. However, there are other platforms like USSD (Unstructured

Supplementary Service Data) used by Vodacom in Tanzania (Cramner and Sjöblom, 2009). Fig. 3 illustrates five basic steps that the sender goes through to transfer the money. An encrypted text is then sent to the recipient to inform him/her about the transfer and confirms the recipient's new account balance in the m-wallet. The fourth and final step (4) involves a recipient visit to the agent to cash-out the transferred e-value. The recipient might also decide either to use it for making payments or leave it in the account (store of value) for a while.

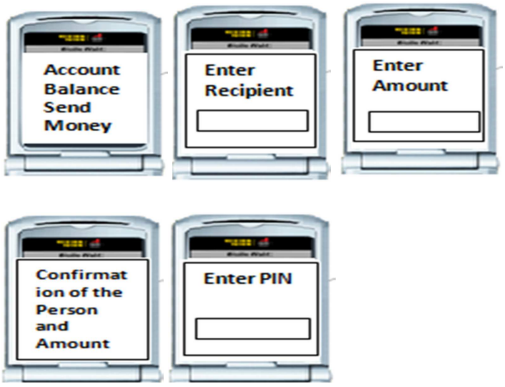

Figure 3: Steps in mobile money transfer

7. Mobile Payments

There are a number of definitions provided for mobile payment in the literature. Kauffman and Au (2008) define it as 'any payment where a mobile device is used to initiate, authorize and confirm an exchange of financial value in return for goods and services'. The kind of mobile devices used in this definition includes mobile phones, PDAs, wireless tablets, and any other devices that can connect to mobile telecommunication network and make it possible for payments to be made (Cramner and Sjöblom, 2009). The broader definition of mobile devices blurs the distinction between electronic payment in general and mobile payment specifically. Therefore, for the purpose of the present study, a more precise definition is adopted from Leizenberg and Achterberg (2010), which state that a mobile payment is 'a payment (transfer of funds in return for a good or service) where the mobile phone is involved in the initiation and confirmation of the payment. The payment location of the payer is not important: he may or may not be 'mobile' or 'on the move' or at a point of sale'.

This definition distinguishes the use of a mobile communication for payments from the actual use of a mobile handset. Mobile money in its current implementations refers to the use of a mobile handset, not the communication infrastructure. However, this definition excludes person-to-person

payments and the use of mobile phones in micro-finance payments. The mobile payment structure is embedded in the mobile money transfer described above. For mobile payments to take place in this context, there has to be mobile money registered customers with e-value in their mobile wallet and a registered mobile money merchant. Then following the same transfer process as in the person-to-person transfer process, a transfer is made to the merchant. A merchant would usually have a connection between his/her mobile money account and an actual bank account.

Mobile Money Technologies

The main technological platforms identified in the ecosystem are SMS based SIM Toolkit (STK), Unstructured Supplementary Service Data (USSD) and Near Field Communication NFC (Bourreau and Verdier, 2010). SMS and USSD are mainly used for mobile money transfer whereas NFC is for mobile payment. Moreover, the STK is deemed to be more user friendly than the USSD. Almost all of the key implementations of mobile money use STK with a few bank-led (e.g. Standard Chartered Bank of Ghana) using the USSD. The introduction of NFC POS (Point Of Sale) to merchants seems to be on the agenda of most mobile money service providers. It is seen as an easier way to get the unbanked to use an electronic payment system.

8. MOBILE MONEY ECOSYSTEM MODELS

A sound mobile money ecosystem must consider the economic interest of all participants, so that everyone has an incentive to participate (Gordijn, 2002). Slywotsky (1996) defines a business model as 'the totality of how a company selects its customers, defines the tasks it will perform itself and those it will outsource, configures its resources, goes to market, creates utility for customers and captures profit'. By this definition, this section will describe the various possible ecosystem models using cases of existing mobile money businesses. Even though it will be impossible to have a complete MNO-led or bank-led mobile money operation, mobile money ecosystem models can be bank-led (Standard Chartered, Kenya and Ghana), Mobile Network Operator led (Zap, Airtel, Mobile Money by Airtel), or independent content provider led (Boer and de Boer, 2010). All the identified types of ecosystem models depend on some sort of collaboration between the key players in the mobile money ecosystem. The distinctions are made based on the extent of business ownership and control within the ecosystem.

MNO-led Model

In most implementations of mobile money, the Mobile Network Operator acts as the business owner, who forms collaborations with some banks to provide services such as float holding and regulatory compliance. The MNO creates the customer relationship, provides the distribution channel, and employs the services of a mainstream bank for the clearing and settlement function. It controls the registration of the customers, agents and distribution channels, and owns any of the types of equipment (agent phones) used for processing the end-user transactions. Furthermore, the MNO builds the m-commerce application, integrates it into a financial institution's application for the processing of transactions. For regulatory purposes, actual financial transactions are still undertaken by the financial institutions. In most countries, the financial sector is regulated by a different regulator than the telecommunication sector. Hence, the requirement of a financial institution is to ensure that some amount of financial regulatory compliance requirements can be enforced on the financial transactions. Most MNO-led mobile money businesses rely on the SMS based SIM Tool Kit (STK) technology for their transactions. However, contactless NFC has been introduced in some of the markets and seems to be the most appropriate technology for the future.

A typical example is Safaricom's M-PESA in Kenya. Safaricom launched M-PESA in March 2007 (for detailed accounts see Mas, 2008). It then approached all the major banks in Kenya to establish a mobile payment system; however, it was only Commercial Bank of Africa (CBA) who gave them an affirmative response. A trust account in the name of M-PESA Holding Company was created to hold the deposits of all M-PESA users. As M-PESA grows bigger, other trust accounts have been created with the Standard Chartered and the CFC Stanbic Banks. Currently, customers can use M-PESA to transfer money in and out of accounts at 14 banks. M-PESA has more than 21,000 agents managed by several hundred Agent Network Managers (Aggregators) and 13 million registered customers (more than half the adult population).

The infrastructure, customer relationship, and distribution channels were all initiated by Safaricom. There also exists a Service Level Agreement (SLA) between the banks and Safaricom, which specifies how long transactions are supposed to take and ensures that the banks do not compete

with M-PESA's targeted middle to low-income customer base. CBA and M-PESA Holding Company, for instance, negotiate the interest on the deposits regularly.

Bank-led Model

The traditional banking model requires brick-and-mortar branches as the primary point of contact. This makes it unprofitable to reach all the low-income segments of a given population. A bank-led mobile money service enables the bank to serve a market that it otherwise would have had to forsake. It is generally referred to as branchless banking. In a bank-led business model, the financial institution provides the application and maintains the customer and agent relationships. However, it still requires a MNO to provide the channel for domestic transfer and international remittance. Usually, transfers could only be made between customers of the same bank using a USSD gateway. There are only a few examples of bank-led business model mobile money services. There were only 2 out of 31 mobile money launches, which were bank-led with 2010 (GSM Association, 2010). Examples of bank-led operations are Omni from UBL in Pakistan and Send Money from First National Bank.

The Omni branchless banking service was launched in Pakistan by the United Bank Limited (UBL) in 2010. UBL is the second largest bank in Pakistan with assets in excess of $7.5 billion. UBL developed its own mobile money application in-house and, therefore, has full control over its support and future extensions. The bank was responsible for recruiting, training and managing its retail agents and had within a year recruited 2000 agents. Omni customers can perform a range of services including opening an Omni account (these were differentiated from the bank's normal accounts by using customer phone numbers), deposit into or withdraw from that account, pay bills or send remittance to other Omni account holders. The key advantages enjoyed by the bank-led business model, is the ability to remit to users irrespective of their mobile network operator and the existing trust with banks dealing with money.

The independent content provider is usually network provider and bank neutral. Irrespective of your NMO, you are able to utilize their services using an SMS short code feature available on all mobile networks. However, one or more collaborations must be created with an established bank to store value and process the back-end financial transactions.

9. Symbiotic Relationships

The aim of the business ecosystem is to address the breadth of inter-actor relationships, which the

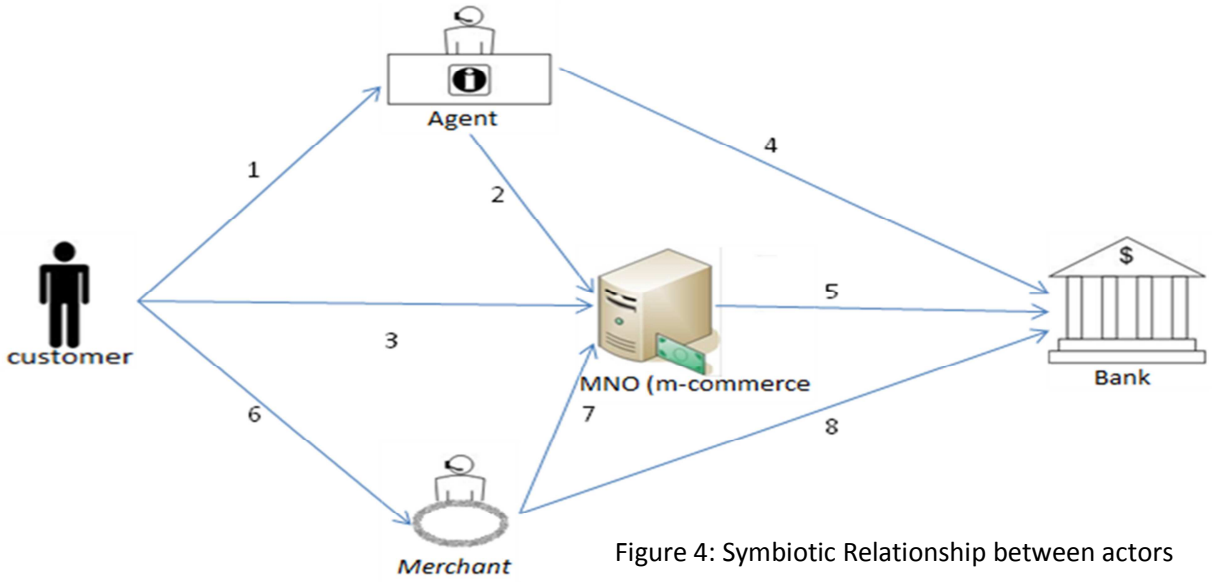

Figure 4: Symbiotic Relationship between actors

conventional hierarchy does not effectively address (Moore, 2005). To better understand the mobile money ecosystem, we adapt the symbiotic relationships described by Fransman (2007) and their multi-dimensionality. Fransman (2007) posits that 'symbiosis exist when the members of two different species live together in close interaction with consequences that may or may not be beneficial for the parties concerned'. Extending this concept, a keystone strategy for the business ecosystem is proposed as an obligate symbiotic relationship. In an obligate symbiotic relationship, the actors entirely depend on each other for survival. Adopting a MNO-led ecosystem model, there are eight symbiotic relationships that occur in the mobile money ecosystem as shown in figure 4. The eight symbiotic relationships identified are analyzed within one or more of the following dimensions as shown in table 1 below.

Table 1: Dimensions of the symbiotic relationships - Adapted from Fransman (2007)

	Dimensions
A	Transactional - Financial flow
B	Information flow
C	Input flow into the innovation process

Symbiotic relationship 1 between the customer and the agent

The agent is the primary point of contact for the customer and acts as the intermediary between the MNO and its customer. There is usually trust, cooperation and respect between the agent and the customers. The agents are usually respectable individuals and businesses within the customer's community.

Often the relationship begins with the customer registration process. This aspect involves an informational flow with the agent collecting the appropriate information for registration. Furthermore, agents gain knowledge about the customer's use of the services and their specific requirements through continuous interactions. This knowledge is then passed on (feedback) as an input flow into the innovation process of the MNO or bank. Furthermore, the agent-customer relationship leads to transactional flow. The cash-in / cash-out processes provide an input-output phase for the mobile money transactional process. This relationship is responsible for the purchase and sale of e-value between the customer and the agent.

The customer has a collective relationship with all the agents in a given community as a whole. For example, where a particular M-PESA agent has no e-float, a customer can go to any other agent available. The strength of the ecosystem depends very much on this symbiotic relationship.

Symbiotic relationship 2 and 4 between agent and MNO and/or bank

The agents are recruited, trained and continuously supported by the provider depending on the specific business model. For a detailed account on operator and agent relationships, see Flamming et al. (2011). This cooperation provides the MNO with access to the customer and provides the agent with a new line of business. The key steps in establishing this relationship are the selection of agents, getting agents started, and paying agents. Providers have three options to acquire agents: use existing retail chain, leverage a wholesale distribution system, or build a network from scratch. Different options have been applied by operators. For example, Safaricom's M-PESA in Kenya and Airtel's ZAP in Ghana both started by building an agent network from scratch. However, Airtel's EKO in India was started through the distribution system of EKO.

Relationship 2 and 4 are different from relationship 1 in that they are usually contractual. The contract spells out the roles and responsibilities of both parties and it may include the minimum

amount of cash, and float agents must have on hand customer care, branding, client identification, and how and when commissions are going to be paid. In most implementations of mobile money, a set of books is given to the agent to keep records of transactions and for registration of customers. This forms a primary source of information for the operator. Informally, the agents provide contextual information to the operators, which are then used as a source for further development of the services. The agents are monitored regularly by the operator. In the case of M-PESA, Safaricom's territory managers visit agent sites once a month to assess and rate their performance (Mas and Morawcynski, 2009).

The buying of electronic value of the operator is done through an Agent Network Manager (ANM) or aggregators or distributors. This is to avoid dealing with an individual agent in the buying and selling of the e-values. However, commissions are paid directly to the agents. The agents earn commission for mobile money services rendered. However, the methods for calculating agent commission vary from provider to provider.

Table 3: Methods for calculating agent commissions

Methods	**Advantages**	**Disadvantages**
Flat Fee	Very simple to understand, appropriate for rural agents	In this scenario, providers are not motivated to accept large amounts. In the same example above, if an agent gets US$0.10 per transaction, he will earn US$10 by doing the 100 small transactions but just US$0.10 for the one large transaction.
Percentage of total cash-in/cash-out transaction	Simple to Understand	Deters agents from transacting at low amounts. For example, if agents get paid 1 percent for a cash-in transaction, they get paid —US$5—if they get one large cash-in payment of US$500 they then would not like to spend the same amount of time on US$50 which will only earn him US$0.50. May not accept small transactions leading to poor customer service.
Fee per tier	Paying a fixed amount for every tier (e.g., US$0.10 for a cash-out transaction of less than US$2, US$0.20 for a cash-out transaction of US$2–4, etc.) allows providers to pay more in absolute terms for higher values, but less in percentage terms.	This is a difficult method for agents to quickly understand and memorize. Agents may encourage customers to "split" transactions into several small transactions so that the agent can earn more.

Both Airtel's ZAP and Safaricom's M-PESA apply the commission per tier approach in calculating the agent's commission. This means that the lower the average amount per transaction, the more money the agents make.

Table 4: M-PESA Agent Commission (Ksh)

Transactions up to:	Commission per Transaction		
	Cash-in	P2P	Cash-out
2,500	10	0	20
5,000	10	0	40
10,000	15	0	60
20,000	20	0	120
35,000	40	0	140

Source: local agent

Furthermore, in order to attract and maintain agents in the initial setup stage where transactions are low, operators usually pay commission for registration of new customers. M-PESA pays a flat rate of $1 per customer registration.

Symbiotic relationship 7 and 8 between the merchant and the MNO or bank

The symbiotic relationship between the merchant and the operator is similar to relationship 2 and 4, in that they provide channels to the customer. Merchants are also enrolled and trained to provide the payment services to the customers. Unlike the agents, merchants have a separate relationship with the customer over and above the mobile payment service. Operators can argue for the ownership of the customer base and prescribe how the agent relates to them. However, that is not possible in the symbiotic relationships 7 and 8. The species in this relationship have equal rights and access to the customer. In fact the consumer is a customer to both species.

The symbiotic relationships 7 and 8 are very fluid. They differ from one ecosystem to another and depend on the maturity of the ecosystem and the individual merchant. According to a mobile money service project manager, the transactional charges for mobile payments are negotiated based on the merchant. He stressed that, usually, merchants do not want their customers to be charged for the transactions. Rather, merchants pay a fee for the convenience, security, and speed that the mobile money service affords them. Furthermore, whereas some merchants interface the m-commerce system through a point of sale (POS), users interface it through a web portal. The

amount of transactions and the influence of the merchant seem to influence the symbiotic relationships 7 and 8 a great deal. However, in certain cases a convenience fee is charged to the customer. This is then split between the merchant and the operator.

Usually, very little information flows between the merchant and the operator regarding the activities of the customer which is deemed to be trade secrets by both species.

Symbiotic relationship 3: Relationship between the customer and the provider

Customers have direct relationships with the provider either as their network provider or as their bank as well as an indirect relationship through the agents and merchants. Where interoperability between various operators is allowed, customers of other MNOs can become your customers on the mobile money platform. The health of this relationship depends on the fees, trust and accessibility.

The health of symbiotic relationship 3 depends partially on how reasonably customers perceive the transactional cost involved in a mobile money transaction compared with other alternatives. To create and maintain the relationship with the customer, the total net tariff rates for depositing and sending money using mobile money services should be lower than, for example, the Western Union money transfer. Although given the nature of the service and its focus of bringing financial services to the unbanked, recent studies produce conflicting results on the effect of costs as a key determinant of its acceptance (Tobbin, 2010). There are other salient factors that influence the health of this relationship, namely perceived usefulness, perceived ease of use, trust and risk (Tobbin, 2010). However, Morawczynski (2009) cited customer fees as one of the key catalysts for the success of m-PESA. Table 3 indicates the customer fees structure of M-PESA .

Table 3: M-PESA Customer Fees (Ksh)

TRANSACTION TYPE	TRANSACTION RANGE (KSHS)		CUSTOMER CHARGE (KSHS)
	Min	Max	
Value Movement Transactions			
Deposit Cash	50	70,000	Free
Registered User Cash Withdrawal	50	100	15
	101	2,500	25
	2,501	5,000	45
	5,001	10,000	75
	10,001	20,000	145
	20,001	35,000	170
	35,001	50,000	250
	50,001	70,000	300
Unregistered User Cash Withdrawal	100	35,000	0
Cash transfers to registered users	50	100	10
	101	35,000	30
	35,001	70,000	60
Cash transfers to unregistered users	100	2,500	75
	2,501	5,000	100
	5,001	10,000	175
	10,001	20,000	350
	20,001	35,000	400

Information gathered about the customer can be used to further develop the mobile money service. The service provides a platform for customer-provider co-creation of innovation. For example, traders who travel between towns and villages in the rural areas have turned to mobile money for secure transfer of funds. To avoid the risk of robbery when travelling between towns, traders in certain parts of Ghana have been buying e-value with their sales proceeds and cashing out at their destination. Others have found the mobile wallet as a useful savings wallet (no interest savings account).

Symbiotic relationship 5: Relationship between the provider and the bank.

The relationship between the MNO and the bank depends on the adopted business model. Most implementations of mobile money adopt the bank-led business model. The banks relate to the MNO through a separate registered company created to manage the funds in the m-commerce platform. A trust account is created by the partner bank to hold the total e-value on the m-commerce platform in the partner bank. In a mobile money ecosystem, the bank and the MNO depend on each other for their survival. Whereas the MNO provides the infrastructure to reach

the customers at the lowest cost, the bank through its banking experience and settlement license provides the MNO with critical banking services required by national financial regulators.

10.Analysis of Mobile money Ecosystem

Levien and Iansiti (2002) identified three innovation and operations strategies that organizations within an ecosystem should adopt depending on their role in the ecosystem: keystone, dominator, or a niche player. They defined keystones as the mediators of the ecosystem's health who is richly connected hubs that provide the foundation for creating many niches, mediate connections among ecosystem members and work to increase diversity and productivity (Iansiti and Levien, 2004b). The survival of an ecosystem depends on the existence of a keystone and its performance.

As a developing ecosystem, mobile money ecosystems in the developing world are faced with constantly and rapidly changing environment, which will be best suited for a keystone and niche player strategy. A network of asset-sharing relationships with a keystone to regulate the health and performance of the ecosystem is the best strategy for this environment. This is explored by using Safaricom's M-PESA as a case study:

Safaricom launched M-PESA in March 2007 - for detailed accounts see Mas and Radcliffe (2010). It then approached all the major banks in Kenya to establish mobile payment systems. However, it was only Commercial Bank of Africa (CBA) who gave them an affirmative response. A trust account in the name of M-PESA Holding Company was created to hold the deposits of all M-PESA users. As M-PESA grew bigger, other trust accounts were created with the Standard Chartered and the CFC Stanbic Banks. Currently, customers can use M-PESA to transfer money in and out of accounts at 14 banks. Safaricom accepts deposits of cash without any fee from registered M-PESA users. The sender pays a fee and the recipient pays, when withdrawing the funds. However, transfers are subject to availability of network coverage (Suri, 2010). M-PESA has more than 21,000 agents managed by several hundred Agent Network Managers (aggregators) and 13 million registered customers. Dozens of merchants and utility providers are also engaged on the M-PESA platform.

MNO as a dominator or hub landlord

To adopt a dominator strategy, Safaricom will have to vertically integrate and control the entire ecosystem. In the past, a number of businesses adopted this strategy to the doom of their ecosystem (Iansiti and Levien, 2004b). A dominator strategy aims at taking over the ecosystem by

eliminating all other species in their closest niche. A dominator behavior in a mobile money ecosystem would include the acquisition or creation of a financial institution by Safaricom and, vice versa, the taking over of its distribution channels and agents. It will make it difficult for actors to plug-in directly into the m-commerce system and would prescribe the activities of the other species in the ecosystem. Furthermore, as a hub landlord, it will aim at controlling the activities of the agents, banks, merchants, and retailers to maximize value. Dominators are the only source of innovations in their ecosystem and give little or no room for the other species to innovate.

Although Safaricom, like most MNOs in the mobile money ecosystem, cannot be said to have adopted a dominator or a hub landlord strategy as described above, some of its activities have dominance tendencies:

- Safaricom's M-PESA m-commerce platform is not open to the other species. It is not possible for other species to create plug-ins into the m-commerce system.
- Safaricom controls the usage of the platform and provides hands-on guidance to the agents and the banks on how to use it.
- Safaricom's relationship with the other species is more of a partner management, hands-on approach, steering on individual partners, enforcing them to conform to certain standards or to acquire certain training or capabilities (Suri, 2010).

MNO as a keystone

On the other hand, where Safaricom adopts a keystone strategy, it will have to work to ensure the survival and health of the ecosystem by directly acting to improve the health of all the species in the ecosystem. To achieve this, instead of the partner management approach, Safaricom will have to adopt system governance – hands-off approach (Tobbin, 2010). With system governance, Safaricom will establish the enabling environment for the other species to take advantage of it. There are a number of current activities of Safaricom's M-PESA that characterizes a keystone strategy:

- Safaricom works towards the growth and success of the agents and merchants through training, monitoring and general support (Merritt, 2010).
- It provides for a fair distribution of value in the form of commission to the other species (agents and aggregators).
- It allows customers to find different uses for the service without any additional cost.
- It acts as a central force, which pulls all the species together as in a 'biological' ecosystem.

The above activities are in line with the following business ecosystem governance principles formulated by Hartigh and Anggraeni (2007):

> "Providing network members with an incentive and vision to strive for a common goal, giving them the freedom to reach that goal on their own initiatives so that their motivation is not hampered by obstruction, while using steering mechanisms to ensure that their activities will reach this common goal, in an effort of improving the business ecosystem's capability of coping with exogenous changes and the internal pace of innovation".

Some of these ecosystem governance principles have been applied in most successful implementations of mobile money initiatives to date. Typical examples are the M-PESA in Kenya, WIZZIT in South Africa and the Celpay in Zambia. All these successful initiatives have the MNO as the central force which pulls all the 'species' together as in a 'biological' ecosystem (Merritt, 2010). The MNOs provide both monetary and operational incentives to the agents, merchants and the customer to reach their common goal. Where necessary, the MNOs have provided extra commission as an incentive to the agents (Mas and Radcliffe, 2010). For example, in order to get agents to establish the service during the initial setup period, MNOs have been given the agent's commission on registration of customers.

Further, Safaricom's fee and commission structure ensures an even distribution of value, which is a core feature of a keystone strategy. For example, the total fees involved in a customer's transfer of 5000ksh to another registered customer is (0 + 30 + 45) 75ksh. From this transaction, the agent receives (10 + 0 + 40) 50ksh, 67% of the total fees charged. Also, a transfer of 2500ksh would lead to a fee of 55ksh and a commission of 30ksh. The reasonable proportion of fees charged, given a commission to agents coupled with the registration commission, meets the core principle of providing network members an incentive to strive for a common goal.

The banks also benefit from MNOs' keystone activities. Initially, the MNOs in most implementations were not paying any interest on the funds mobilized through the e-float (trust) account. Currently, Safaricom on monthly bases negotiates an interest rate with its bank depending on the balance of the e-float account (Merritt, 2010). However, Bank of Ghana, the banking regulator in Ghana insists that banks do not pay any interest on the e-float account. This provides the banks with enough incentive to strive for the common goal of the system. Furthermore, most implementations have allowed access to the MNOs' m-commerce system for the banking applications. This is to enable

easy transfer of funds of the mobile money account to existing bank accounts of customers with bank accounts (and vice visa), presenting the m-commerce as a platform for the banking industry (Mas and Radcliffe, 2010). Another feature of M-PESA which can be considered as a keystone strategy is the ability to transfer funds to and from non-Safaricom customers. This provides the customer with an additional incentive to use the service.

Niche Players

A niche player has been defined by Leizenberg and Achterberg (2010) as an organization that exhibits typical levels of connectivity with other ecosystem participants. In the mobile money ecosystem, the merchants and distribution channel agents can be classified as niche players. They perform an effective role of contributing to the development of new products. They are the source of diversity in a business ecosystem. Niche players concentrate on a specific aspect of the ecosystem and hence develop deeper relationships and understanding in that area. As the ecosystem evolves, new niches (e.g. small microfinance organizations) will be developed and the ability to allow other players to occupy these areas is what defines a keystone strategy.

The role of the MNO as a keystone is to develop strategies that will foster the creation and development of niches in the mobile money ecosystem. By adopting a platform strategy, MNOs can enable the development of niches in the system. For example, Near Field Communication (NFC) is recognized as a promising technology for mobile payments (Langer et al., 2008). Instead of the MNOs implementing the NFC, a platform manager could be engaged to develop the system, creating a new niche player in the mobile money ecosystem. The MNOs will then benefit from increased traffic on their network (Morawczynski, 2009) and also provide monitoring and supervisory mechanisms to ensure that their activities reach a common goal.

The financial institutions are also possible keystones in a mobile money ecosystem. This may depend on the business model (bank-led or MNO-led) that is adopted. The financial institutions in their role as intermediaries between the merchants (including the utility companies) and the MNOs in the mobile payment aspect of the mobile money structure could adopt a keystone strategy. They can work to increase productivity and diversity in the ecosystem by providing additional services like payment of NFC POS devices for the merchants and providing training and advice to the merchants.

The giving of start-up loans to small mobile money agents will encourage the setting up of new agents, since the availability of agents is one of the key factors that affect the adoption of mobile money (Merritt, 2010).

11.Conclusions

The purpose of this study has been to explore the ecosystem of mobile money through a detailed discussion of its key players, its structure and the activities involved using Iansiti and Levien's keystone advantage framework. It has identified the actors of the ecosystem and using Safaricom's M-PESA as a case study and has analyzed the various strategies and the corresponding activities of an MNO in the mobile money ecosystem. The following conclusions can be drawn from the study:

- MNOs have a pivotal role to develop the infrastructure, applications, and processes needed to sustain the mobile money ecosystem.
- However, in doing this, there is a need to go beyond traditional business decisions that only optimize the individual businesses' performance and to take into consideration their relationship with other firms within the ecosystem.
- Thus, a keystone strategy seems attractive because this strategy is best positioned to provide the necessary vision and support that would ensure their collective survival.
- And, the proposition is that the m-commerce application should be developed and managed by a separate organization - an application service provider (ASP) - to provide the communication network as an infrastructure platform. This will increase the diversity in the system.
- However, the MNOs should have in place, policies, and procedures to monitor activities so that the development does not get out of hand.

It is observed that most existing implementations exhibit traces of a keystone strategy with some level of hands-on partner management and a few characteristics of hub landlord. To be less dominant, MNOs could foster the creation of new niches and provide them with the necessary support to develop innovations.

The development of mobile money cuts across two regulatory bodies in most countries (telecommunication and banking). Therefore as the ecosystem develops, new policies and regulations would be developed to monitor the mobile money activities. Thus, clarifying and understanding the relationships between actors within the mobile money ecosystem is a crucial issue to improve the efficiency of future competition and regulation policies.

12.References

Au I RJ Kauffman (2008) "The economics of mobile payments: understanding stakeholder issues for an emerging financial technology application," *Electronic Commerce Research and Applications*, vol. 7, no. 2, pp. 144-164.

Boer Tonnis de Boer Remco (2010) Mobile Payments*: Market Analysis and overview*, 101st ed., Chiel Liezenberg (Innopay) and Ed Achterberg (Telecompaper), Ed.: Innopay, 2009.

Bourreau Marc and Verdier Marianne (2010, May) Cooperation for Innovation in Payment Systems: The Case of Mobile Payments. Economix Working Paper.

Cramner Gunnar and Sjoblom Emil. (2009, July) Can the success of M-PESA be repeated? A review of implementations in Kenya and Tanzania. Value Bits note.

D Porteous (2006) "The Enabling Environment for Mobile Banking in Africa, report commissioned by the UK DFID," Somervile, MA.

Dahlberg Tomi, Mallat Niina, Ondrus Jan, and Zmijewska Agnieszka (2008) "*Past, present and future of mobile payments research": A literature review*.: Elsevier B.V. Doi.

Donner Jonathan (2008) '*Research Approaches to Mobile Use in the Developing World'*.

Flamming et al (2011), *The Mobile Financial Services Development Report.*

Frosch R.A. and Gallopoulos N.E. (1989) "Strategies for Manufacturing," *Scientific American*, vol. 261, no. 3, pp. 144-152.

Gordijn. (2002) "*Why Visualization of E-Business Models Matters*".

Hartigh Den and Asseldonk van T. (2004) "Business Ecosystems: A research framework for investigating the relation between network structure firm strategy, and the pattern of innovation diffusion; ," in *Contribution to the European Chaos/Complexity in Organisations Network (ECCON)*.

Hartigh Erik den and Anggraeni Marc Zegveld Elisa (2007) Business ecosystem as a perspective for studying the relations between firms and their business networks. ECCON 2007.

Hughes Nick and Lonie Sussie (2007) "M-PESA :Mobile Money for the "Unbanked" Turning Cellphones into 24-Hour Tellers in Kenya," *Innovation*, Winter & Spring.

Iansiti M and Levien R. (2004a) "Strategy as Ecology," *Havard Business Review*, pp. 68-78.

Iansiti M and Levien R. (2004b) *"The Keystone Advantage: what the new dynamics of business ecosystems mean for strategy, innovation, and sustainability"*. Cambridge, MA: Harvard Business School Press.

Isckia Thierry (2009) "Amazon's Evolving Ecosystem: a Cyber-bookstore and Application Service Provider.," *Canadian Journal of Administrative Sciences*, vol. 26, no. 4, p. 332+.

Ivatury G and Pickens M. (2006)"Mobile Phone Banking and Low Income Customers: Evidence from South Africa," CGAP, World Bank and United Nations Foundation, Washington, DC.

J.F. Moore (1996) *The death of competition: leadership and strategy in the age of business ecosystems*. Chichester: Willey & Sons.

Jenkins Beth (2008) "Developing Mobile Money Ecosystem," IFC and the Harvard Kennedy, Washigton, D.C.

Langer Josef, Madlmayr Josef Scharinger Gerald, "Managing an NFC Ecosystem," in *7th International Conference on Mobile Business*, 2008, pp. 95-101.

Leung L. and Wei R. (2000) "More than just talk on the move: Uses and gratifications of the cellular phone.," *Journalism and Mass Communication Quarterly*, pp. 308-320.

Levien and M, Iansiti R. (2002) Keystones and Dominators - Framing the operational dyamics of business ecosystem. Working Paper.

Liezenberg Chiel and Achterberg Ed, *Mobile payments 2010: Market analysis and overview*, 101st ed., Chiel Liezenberg and Ed Achterberg, Eds.: Innopay, 2010.

Mas Ignacio and Radcliffe Dan (2010) "Scaling Mobile Money".

Merritt Cynthia (2010) "Mobile Money Transfer Services: The Next Phase in the Evolution in Person-to-Person Payments".

Mitleton-Kelly E., "Ten Principles of Complexity and Enabling Infrastructures.," in *Complex Systems and Evolutionary Perspectives on Organizations: The Application of Complexity Theory to Organizations.* Pergamon, Amsterdam., 2003, pp. 23-50.

Moore J.F. (1993) "A new ecology of competition," *Harvard Business Review*, pp. 75-86.

Morawczynski Olga. (2009) "Exploring the usage and impact of transformational m-banking: The case of M-PESA in Kenya, mimeo".

Peltoniemi M. (2005) "Business ecosystem: A conceptual model of an organization population ," Tampere University of Technology and University of Tampere, Tampere, Finland.

Pulver Caroline (2009) "The performance and impact of M-PESA," Financial Sector Deepening.

Roehrich Gilles (2004) "Consumer Innovativeness Concepts and Measurements," *Journal of Business Research*, pp. 671-677.

Tavneet Suri William Jack (2010) "Mobile Money: The Economics of M-PESA," Central Bank of Kenya.

The New Oxford Dictionary, 1993.

Tobbin Peter (2010) "Modeling Adoption of Mobile Money Transfer: A Consumer Behavior Analysis," in *Mobile 4 Development*, Kampala.

Venkatesh Viswanath (2003) "User Acceptance of Information Technology Towards a Unified View".

Wei R. (2001) "From luxury to utility: a longitudial analysis of mobile phone laggards.," *Journalism and Mass Communication Quarterly*, pp. 702-719.

Yujuico E. (2009) "All Modes Lead to Home: Assessing the State of the Remittance Art," *Global Networks*, vol. 9, no. 1, pp. 63-81.

The adoption of *"Transformational Mobile Banking"* by the Unbanked: An Exploratory Field Study

Tobbin, P. (2012). The Adoption of "Transformational Mobile Banking" by the Unbanked: An Exploratory Field Study. *Communications and Strategies*, (86), 103.

Abstract

Whereas the number of people using mobile phones grows tremendously across the developing world; the number of people having a bank account is still very low. A recent report shows that over half the population of the world is unbanked, a majority of which are rural dwellers in the developing world. The primary aim of this exploratory study is to examine whether or not m-banking services can be transformational. During the study, an extensive review of the literature on the unbanked and the adoption of m-banking services were conducted. This was followed by a focus group discussion which was conducted among the unbanked rural dwellers in Ghana. The current study concludes that the transformational potential of m-banking could be realised if beyond access, the other barriers to having a bank account, which include affordability, trust, convenience and documentation are addressed effectively in its deployment.

Keywords: unbanked, m-banking services, mobile money, TAM, adoption, consumer behaviour.

1. Introduction

The unique attributes of mobile technologies such as ubiquity and convenience coupled with the rapid growth of mobile phone usage in the developing world has made the mobile phone the preferred choice for delivering financial services to the "unbanked". The unbanked are people without formal bank accounts who operate in a cash economy; they are limited in their ability to take loans, maintain savings, or make remote payments (Medhi & Ratan, 2009). The unbanked are not part of any formal financial institution. A number of studies have linked the economic growth and social development of the developing economies to access to financial services by its rural and poor population (Beck, Levine, & Loayza, 2000; Beck, Demirguc-Kunt and Levine, 2004). Policy

makers and developmental agencies have therefore been looking for measures that will increase access to financial services by the rural unbanked (Ivatury, 2008). One such solution that has been identified and introduced in some developing countries is m-banking services. However, the adoption and use of these services among the rural unbanked in the emerging economies have not been consistent. The main interest of the present research is in consumer behavior towards m-banking services with particular attention to the unbanked.

In the present study, m-banking service is defined as "the type of execution of financial services [in] which the customer uses mobile communication techniques in conjunction with mobile devices" (Baratti & Mohammandi, 2009). M-banking frees users of spatial and temporal limitations and enables them to conduct remote payments. This provides great convenience to users. Although there have been an increasing number of studies on the adoption of m-banking, most current studies are limited to m-banking as an additive service, not a transformational service. Whereas m-banking is a complementary service for the urban banked consumer, it is a substitution service for the rural unbanked. Transformational m-banking is bringing financial services to the unbanked through mobile technologies (Porteous, 2006). The unbanked population has unique characteristics that may affect adoption decisions. It is therefore necessary to assess how these unique characteristics affect their acceptance of the technology.

The main research question is how can m-banking be transformational? In other words, what key factors would influence the acceptance and use of m-banking by the rural unbanked in Africa? To answer these questions, the current research applies a qualitative approach, specifically; focus group discussion, to reveal the underlying intentions of the rural unbanked towards the use of m-banking services. Focus Groups provide an opportunity to capture the meanings that consumers give to different aspects of the reality they live in through group dynamics and interactions (Jarvenpaa and Lang, 2005). Furthermore, the discussions sought an explanation as to why people are "unbanked" to extend knowledge of the motivational and inhibiting factors which contribute to being unbanked among the rural population.

The present study provides the findings of a preliminary study on the factors that influence the adoption of m-banking services by the rural unbanked population in Ghana. The unique contribution of this exploratory study is in identifying key factors that influence the unbanked's

intentions to adopt and use m-banking services in a rural population. The paper begins with a literature review on the unbanked, m-banking and m-banking adoption, followed by a brief account of the methodology used in this study. The third section details the findings of the focus group discussions. A summary of managerial implications will follow and then the final conclusions.

2. Literature Review

THE UNBANKED

Earlier research has identified the number of adults without access to banking services as being 2.5 billion, more than a third of the world's population (Chaia et al. 2009). The total number of mobile phone owners without access to banking services is estimated to be 1.7 billion at the end of 2012 (Beshouri & Gravråk, 2010). Research suggests that these individuals are located in both the developed and developing world and that there are millions of Americans who rely on high-cost currency exchanges and pawn shops to conduct everyday transactions like cheque cashing, making payments and taking out short term loans (Lyons & Scherpf, 2004). Although, there are some poor households without access to banks in the developed world, the situation is precarious in the developing world, particularly in Africa. In a series of studies conducted by FinMark Trust exploring individuals' usage of and attitude towards financial services in African countries, it was observed that in many African countries, less than one in five people have access to a formal bank account (FinMark Trust, 2009). However, in these countries, there is an increase in informal financial services in the form of community-based financial support groups and associations. For example, individuals within a community contribute savings to a pooled account, lend a portion to members and periodically share the proceeds (savings plus interest on loans). An individual (usually well respected in the community) is appointed as a treasurer who stores and disburses the funds. Loans are taken for various reasons including trading, funeral arrangements and payment of school fees for children. In terms of money transfer and payment transactions, the rural/poor households depend on bus drivers, relatives/friends and long distance travel (Aker & Mbiti, 2010).

The term unbanked can be defined as "people without formal bank accounts who operate in a cash economy; they are limited in their ability to take out loans, maintain savings, or make remote payments" (Medhi & Ratan, 2009). However, they may take a loan from local loan sharks or maintain savings informally. For example, in a study of the economic impact of M-PESA in Kenya,

Jack and Suri (2009) found that a large percentage (about 80%) of households studied save money at home “under the mattress”. The literature indicates that people are unbanked for many reasons including: levels of financial knowledge of banking systems and expectation of having a bank account, past negative banking experience, lack of appropriate documentation needed to open a bank account, financial constraints and unstable living situations (Lyons & Scherpf, 2004). However, limited access and poverty are the most common factors in the literature to explain the unbanked. Firstly, the cost of managing branch offices in remote areas in the developing countries is said to exceed any revenues derived from the low volume of banking transactions. Hence, bank branches are limited to urban dwellers leaving most of the rural areas underserved. Policymakers, financial regulators and development agencies such as the World Bank have been looking for diverse ways to increase financial access to the unbanked especially in the rural areas (Bankable Frontier Associates, 2010). The introduction of microfinance institutions, correspondence banks in Brazil, Mzansi accounts in South Africa and numerous branchless banking policies are some of the initiatives that have emerged targeting the unbanked. Secondly, the poor are more likely to be unbanked and bank usage is likely to be low in poor communities. This is corroborated by the findings of Finscope (2007), that most unbanked have no formal earnings, rely on farm income, or live on ‘welfare’ from friends and family.

The importance of studying the unbanked can be seen in the results of studies that relate access to financial services to the economic and social development of economies (Beck, Demirguc-Kunt, & Levine, 2005; Burges & Pande, 2005; Bruhn & Love, 2009). Several authors have found a link between access to financial services and economic growth or poverty alleviation. Although, collectively the unbanked are regarded as poor, there is a substantial number of unbanked people in a cash economy who are reasonably wealthy. By remaining unbanked, the wealth and transactions conducted by these people are informal. Access to a bank has the potential to bring these transactions to the formal economy. For example, Burges & Pande (2005) found that the expansion of bank branches in rural India had a significant impact through alleviating poverty. Furthermore, in a study of the economic impact of the opening of Banco Azteca in Mexico, the results showed a 7% increase in income in the areas where the branches were opened with an overall 1.4% increase in employment (Bruhn & Love, 2009).

M-BANKING BACKGROUND

The anywhere anytime and convenience characteristics of mobile technologies provide an unprecedented potential solution to the financial access problem faced by the emerging economies. The term m-banking is defined as "banking transactions using mobile devices such as cellphones, PDAs (Personal Digital Assistants), smart phones and other devices (except for laptops)" (Lee & Chung, 2009). Most m-banking implementations have a banking application installed on the users' SIM cards. Once signed up, an electronic account is created which enables the user to deposit money into it, withdraw money from it, or transfer money from their account to other users (Tobbin, 2010). The transformational potential of m-banking is the result of its ability to remove the most prevalent barrier to banking - access.

In the developed world, most of what is termed as m-banking is an extension of existing banking services to existing customers of the banks. The mobile phone is only used as another channel to an existing bank account (Porteous D, 2006). Porteous, (2007) distinguishes "additive" m-banking models from "transformational" models, and defines transformational m-banking services as "those in which the financial product linked to the use of the phone is targeted at the unbanked, who are largely low income people". Porteous stresses that a service becomes transformational when it causes a shift in the access frontier. Additive refers to the fact that m-banking complements the services offered by the banking system, such as checkbooks, ATMs, voicemail/landline interfaces, smart cards, point-of-sale networks, and Internet resources; the mobile platform offers a convenient additional method for managing money without handling cash (Donner & Tellez, 2008). In contrast, the transformational model leads to the creation of new accounts for non banking customers. The distinction is particularly important for the industry, researchers, and for policymakers in assessing the usage and impact of the m-banking phenomenon (Donner & Tellez, 2008 p.5). The transformational m-banking services increasingly have been heralded as a tool for bringing financial services to the largely unbanked population in the developing countries.

The transformational potential of m-banking is due to the increased access to the mobile communication infrastructure by the rural unbanked and the introduction of new players such as the MNOs (mobile network operators) and airtime merchants in the financial system. To be

transformational, consumers must understand the relative advantage that m-banking provides to the rural unbanked (DFID, 2008). Furthermore, given the rural unbanked's unique characteristic associated with being poor, it must be affordable and should provide services that the consumer needs (Vodafone group plc. 2007).

The implementations of m-banking, mobile payment and mobile financial services have been referred to collectively as mobile money services. Since it was first launched as SMART Money in the Philippines in 2003, at least 72 mobile money deployments have been launched across 42 developing countries (Mas & Radcliffe, Scaling Mobile Money, 2010). The implementations are taking place using many different models; some are offered entirely by banks (bank-led), others are offered entirely by Mobile Network Operators (G-Cash in Philippines), still others involve a partnership between a bank and a telecommunication provider, while some are independently provided (Celpay, Zambia) (Donner, 2007). In a bank led model, the financial institution takes ownership of the account whilst the MNOs owns the customer relationship and provides the service distribution channels in the MNO-led model. Although no particular model is emerging as superior, mobile network operator models are thriving in developing markets because of their ability to reach large numbers of unbanked people in physically remote locations beyond the reach of bank and landline infrastructures.

Since the launch of Safaricom's M-PESA in Kenya, the deployment of m-banking has been phenomenally rapid. According to the GSM Association, 25 schemes of m-banking started in 2009 and 38 in 2010 and it was estimated that there would be 140 mobile money services by the end of 2011 (Klien & Mayer, 2011). So far the most successful deployment of transformational m-banking services is Safricom's M-PESA in Kenya (Morawczynski & Pickens, 2009). Since its launch in March 2007 it has been adopted by 11.7 customers (corresponding to 54% of Kenya's adult population and 73% of Safaricom's subscriber base). It processes more transactions domestically than Western Union does globally (Mas & Radcliffe, 2010). However, the success story of M-PESA in Kenya has yet to be repeated anywhere else in Africa. A few studies have sought the determinants of M-Pesa's successful adoption in Kenya (Heyer & Mas, 2009), (Suri & Jack, 2010). For example, (Crammer et al., 2009) contrasts the experience of M-PESA in Kenya and Tanzania, and highlights the differences in urbanization and domestic remittance patterns as a key difference explaining the

relative lack of success of mobile money in Tanzania. Further studies in countries where current deployments have not been quite as successful are necessary to extend our understanding of the key determinants of the adoption of mobile money services.

3. Research Methodology

The main purpose of the qualitative research reported here is to examine the deeper motivations and associations that underlie an unbanked consumer's intentions to adopt m-banking services. Previous studies have shown that focus group discussion is a good methodology for studying innovative mobile services (Jarvenpaa & Lang, 2005). The use of open-ended questions in the group discussions allowed participants to explain, comment on and share experiences, attitudes, opinions, and beliefs, with specific focus on the consumer (cognition and emotions associated with consumption intentions). Focus Groups provide an opportunity to capture the meaning that consumers give to different aspects of the reality they live in through group dynamics and interactions. For example, Dahlberg et al. (2008) posit that qualitative studies on adoption are needed to help reveal details of the adoption factors identified in previous research. This research method is employed widely in marketing and consumer behavior research, but its application in consumer early adoption of technology decision making is novel.

The group sizes varied from 8 to 12 with a total of 69 unbanked rural dwellers participating in seven focus group discussions held in different communities in Ghana (Yawkoko, Akorley Anti, Akorley waterworks, Wassaman, Asukesu and Heman). The communities had no electricity or pipe borne water except Yawkoko and Esukesu which had electricity but no water. The distances between the communities and their respective nearest bank were approximately 5km. Participants were selected by sampling through open recruitment, however, in order to foster successful interactions and group dynamics stratification was employed in grouping them. Members of each group were either friends or neighbors. Although the core of each group was between 8 and 12, other members of the community were allowed to join, usually validating the responses of the core group.

Although m-banking was introduced in Ghana in 2009, at the time of this study by MTN it was still quite new to most people especially in the rural areas. An initial introduction and demonstration of the m-banking service was given prior to the discussions. This was to enable the users to appreciate

the services available on an existing m-banking platform and to foster the interactions between the participants. Two registered m-banking accounts for Airtel Money were used for the demonstration.

The discussions followed a semi-structured guide which we developed based on the secondary research on adoption from the information systems literature. Each session took approximately one and a half hours. The discussions were moderated by the researcher with an assistant who took care of video recording the discussions and making notes. In order to ensure that the participants were able to express themselves freely, a local dialect, Twi was used in the discussions. All participants were quite fluent in Twi.

The focus group interviews were recorded, and at the conclusion of each session, the researchers transcribed the video discussions verbatim. During the transcription process, the researchers noted concepts which were repeated across the groups, allowing for the identification of common concepts. First, data were coded into broad categories and each category was then analysed for evidence of the general concepts which the researchers had noted in the discussions and during the transcription process. Common concepts which emerged in the focussing questions across the focus groups were identified as themes.

4. Findings

The field study among rural dwellers revealed important perceptions that affect early adoption of the technology among this section of the population. All participants had very little knowledge of the m-banking schemes available in Ghana. Although a majority of the participants had heard of m-banking through MTN advertisements, only 3 out of the 69 participants had experience with any m-banking service. Most participants in the groups had knowledge of basic financial terms such as savings, loans, insurance and interest.

Description of Participants

The participants were mainly rural dwellers whose main occupation was farming. There were a few traders, who sold foodstuff and other basic necessities in the communities. The traders were largely women whose husbands were farmers and sold basic amenities as an additional source of income. The sample was made up of 63% males and 37% females and about 57% were less than 40

years of age. With regard to education, the majority had basic or no formal education, with only 10% being able to read and write. The size of their farms ranged from 1 acre to 6 acres with the majority less than 3 acres. On average, the participants earned below GH₵80 a month. At the time of the study, $1 was exchanged for GH₵1.6, approximately. Thus, about 73% of the respondents earned less than $50 per month. Apart from being low, their earnings were also volatile, depending on the rains.

Table 1: Characteristics of Participants

	No. of Participants	Land Ownership	Female	Male
AKorley Waterworks	10	0	3	7
Akorley Ayiti	12	4	4	8
Yawkoko	9	5	4	5
Teacher Mante	9	0	2	7
Asukesu	10	6	2	8
Wassaman	10	5	3	7
Heman	9	4	3	6

MOBILE PHONES

In general, all participants had a mobile phone with an average overall mobile experience of three years. The majority (68%) of the participants had only one SIM, while 32% had two or more SIM cards. Where participants had two SIM cards, dual SIM handsets were used. Participants were requested to show their mobile phones and, surprisingly, more than 50% had smartphones. The high rate of smartphone users among the rural unbanked can be explained by the influx of cheap double SIM phones from China. A smartphone from China cost about $80 new and roughly $50 for used phones. Apart from making and receiving calls, about 33% used their phone for texting, listening to the radio and playing music. There was an identifiable link between the level of education and the use of their handsets for other than making and receiving calls. For example, the Akorley waterworks group had the lowest level of education and they all used their mobile phones only for making and receiving calls. In contrast, the Asukesu participants exhibited the highest level of literacy and most of them used the mobile phones for other purposes.

MTN was noted as the most used Mobile Network Operator (MNO) with over 75% of the participants using only MTN and 87% using MTN and other networks. Although this is not a good representation of the dominance of MTN in the Ghanaian telecom market, it is an indication of its coverage in rural Ghana. Most participants affirmed that their choice of mobile operator was based on availability of the network. The Heman community claimed that the only network available to them was MTN. The study also revealed that participants were mindful of their mobile numbers. Most participants had registered their numbers to ensure that they did not have to change if they lose their phones. Two of the participants summed this up:

"My phone number is the only means my friends and family in the city can contact me"

"Losing my mobile number is like losing my identity, how will my customers contact me?"

About 68% of the participants had not changed their mobile operator. Those who had changed their mobile operator cited poor network quality and better pricing as their reasons for changing. Furthermore, participants with dual SIM cards claimed that this enables them to take advantage of promotional (same network) cheaper calls that the mobile operators introduce from time to time. And that it enabled them to maintain their mobile numbers whilst taking advantage of promotions from other networks.

The average frequency of top-up (buying of credit) was about once a week. The amount of top-up a week ranged from GHC3 to GHC10 with the average top-up per week being GHC5. Interestingly, the female participants spent more of their income on buying top-ups than their male counterparts. Considering the average income of GH₵80 per month, the average participant spent 25% of their income on mobile phone calls. This was an indication of the impact of the mobile phone on the life of these rural dwellers. When asked about the availability of an agent, most participants could identify an agent within their community. However, the unavailability of top-ups (units) at the agents' outlet when needed was a major concern for most of them.

BANK ACCOUNT

This part of the discussion was geared towards getting an understanding of why the unbanked did not have an account and what might influence them to open one. It was to discuss whether m-banking is indeed the solution to bring financial services to the unbanked. Although the study

targeted the unbanked, there were some who were previously banked and others who were under-banked (have an account but not currently operating it properly). However, the majority (85%) of the participants had never opened a bank account. Among the few that were banked, most of them had an account with a rural bank and only two had an account with a commercial bank. However, all the banked participants were considered to be under-banked because they reported not using the account because of lack of funds. When asked "why don't you have a bank account?" the majority of the participants cited a lack of funds, accessibility, trust, and volatility of funds as the main reasons for not using a bank. Among the reasons given for being unbanked, the most widely accepted among all participants were firstly lack of funds followed by accessibility, trust, and financial cost.

"There is no money"

"I have no formal job"

"I don't have enough money to save"

"Income from farming is not certain, we depend on the rains"

The majority of the rural unbanked perceives that a formal job is required for opening a bank account. Furthermore, they believe that you must have a reasonable amount of money before an account can be opened. Access-related reasons are the next most important explanation for being unbanked. Although the banks are within 4-8 km of the Akorley Waterworks, Akorley Anti, Yawkoko and Teacher Mante communities, all considered the issue of distance as a major deterrent to having a bank account. However, it was obvious that the introduction of rural banks and micro-finance institutions have increased access to financial services in rural Ghana. The following are some of the comments:

"It cost GH₵4 to get to the nearest bank, which is too much for us"

"The bank is too far from this community"

"Long queues to get your own money back"

However, when asked *"if a bank is opened in your community will you open an account?"* they all responded affirmatively. The discussion changed from "we have no money to open a bank account" to "if the bank is close by, then any little money that you get can be taken to the bank". Although their first reason for not having a bank account was based on the lack of surplus funds,

participants were eager to become banked if the access barriers are removed. However, these findings suggest the importance of addressing underlying economic perceptions and realities and not only the access barriers if financial inclusion is to be achieved.

Another very important set of reasons given for being unbanked were trust-related. A number of the participants did not trust the banks to give them their money when they need it. The following are some of the comments from the participants:

"Once you put your money in the bank it's difficult to get it back"
"I don't trust banks"
"My money may get missing at the bank"
Finally, financial cost (bank charges and high interest on loans) was identified as another set of reasons for being unbanked. All these factors were identified as deterrents to having a bank account.

When participants were asked, "if you had sufficient money, what would encourage you to open a bank account"? 75% responded that they would do so if there was access to cheap loans, 15% if there was high interest on savings, and others mentioned low bank charges as incentives to being banked. The participants in Akorley Anti community insisted that any banking facility to be established in their community would need to be prepared to give them loans. They claimed that loans were required to make their farming business flourish and that all efforts to obtain loans from existing financial institutions had not been successful. However, when asked if they had ever taken a loan, the majority of them answered no. There were only two participants from the Yawkoko group who claimed to have taken a loan, one from a commercial bank and the other from a rural bank. The participants in Akorley Waterworks and Heman were totally against loans and argued that taking a loan could make them poorer. Moreover, informal loan sources including family, friends, spouses and religious organizations were regularly patronized by all participants. Some reasons for choosing the informal sources included proximity, greater trust in these institutions and people, and no or minimal interest rates.

Overall, participants were aware of the importance of savings irrespective of gender or age. Whereas some participants had reservations about taking loans, all participants agreed on the importance of savings. Asked "How important are savings to you?", participants responded:

"Saving is important because it helps you to take care of unexpected events whenever they arise".

"Saving is important for emergency periods, for example my child can be sick at anytime".

The rural unbanked save through their livestock, buying of gold, moneybox and any informal community-based structures. The savings-led group (SLG), and rotating savings and credit associations (ROSCA), where some of the informal financial services discussed. The SLG involves members contributing savings into a pooled account periodically (usually weekly), lending a portion of the funds to individual members and sharing proceeds annually (Basu et al. 2004). Members of a ROSCA contribute money into a pooled account which is then given to an individual member at the end of a period (e.g. quarterly). This is then rotated until all members have received their turn. The lump sum is usually used to begin a trade, pay school fees or bury their dead.

M-BANKING

The m-banking questions sought to assess participants' awareness of the mobile money services introduced in Ghana and whether or not they would patronize the services when introduced in their communities. About 85% of the participants were unaware that m-banking services were available. In some cases for example, in Yawkoko and Wassa, although they had heard of it through a MTN radio/TV adverts, they had not been clear about how the services operate or how they could take advantage of it. They stressed that a demonstration and training on how the services work would be necessary for adoption and use by their communities. In Teacher Mante, a participant had used a similar service where call units were bought by her sister in the city and transferred to her and she intended to sell the units to others for cash.

Having seen a demonstration, listened and discussed the benefits of m-banking services including the cash-in, cash-out, savings, payments and loans, most of the participants generally warmed up to this concept and were anxious to try the services and to explore the benefits to be gained. Among the services explained to the participants, the ability to use the mobile phone to save and be able to cash-out the money whenever they needed it was what interested them most. The traders among the participants discussed the possibilities of buying goods from the regular

suppliers without physically going to the market. Remittance of funds to their children and a few older participants' using it to receive remittances were casually discussed. Surprisingly, using the m-banking concept for remittances did not seem to be a major motivation for the participants in this study. Apart from only two of the participants from the Wassaman group who depended on remittances from their children, most of the participants did not receive regular remittance from relatives in the urban areas. This may explain why the introduction of mobile money in Ghana as a tool for domestic remittance has not been widely accepted. However, a further broader study of this area is required before the findings can be generalized.

When asked what would motivate them to take up m-banking? Most of the participants emphasized time saving and convenience. Other motivations cited included affordability, ease of use, high interest on savings, availability of cash, guaranteed network availability and security of funds. Interestingly, participants from Akorley Anti insisted that their main motivation would be access to loans. Concerning affordability, a number of the participants were worried about the effect of cash-out charges on interest to be received on their savings. They emphasized that higher charges would deter them from using the services. They appreciated, however, that there had to be some charges for the benefits of convenience, reduced transportation cost, and the time saving that the m-banking services would afford them.

Persistent network fluctuations, unavailability of funds from the agents, the effect of loss of mobile phone, unauthorized use and the fear of mistakenly transferring funds were among the barriers to using the services that were discussed. A participant from Yawkoko argued that there were instances when mobile network services in their community were down for almost 72 hours. 'What happens when you need some of your savings during this time', he exclaimed. Although participants debated the validity of the 72 hours downtime, they all agreed that unreliability of the network is a major deterrent to the use of m-banking services. The issue of what happens to the consumer who needs money when the network is down was discussed in all the group sessions. The participants from Heman gave examples of network reliability issues and how this affects trust in mobile communication in general. Furthermore, some of the participants were worried about mistakenly transferring funds to unknown recipients and cited that they had mistakenly called unknown numbers. As one participant from the Wassa group noted:

"What happens if I mistakenly transfer money to an unknown recipient?"

The participants were asked to indicate who they trust to keep their money, a mobile operator or a bank? Surprisingly, the majority of the participants trust the mobile network operator over the banks. Most stressed that they were more likely to find the mobile operator anywhere they go in Ghana than the bank (mostly referring to the rural bank). Existing trust in the operator stems from the established relationship through their use of the mobile phone. Such institutional trust is important for m-banking since customers' money is held in a virtual account managed by the MNO (Morawczynski and Miscione, 2008). Those who trusted the banks more than the mobile operator argued that the banks were more established and had more relevant structures to ensure that they keep the funds than the mobile operators. The level of education of those who trusted the mobile operator more than the bank was lower than that of others.

When participants were asked if they believed the services will be easy to use, they responded yes. Moreover, they expressed the need for further awareness and training and explained that with some level of training they should be able to use them without problems. Most of the participants used their mobile phone only for making and receiving calls. This led to a discussion on the usage of the services by the aged population. Although most participants were confident in their ability to use the services, it was observed that gender and age influenced their perceived ease of use. The younger male participants were more confident in finding the m-banking service easy to use.

MANAGERIAL IMPLICATIONS

The present findings have implications for industry practitioners. The demand for m-banking services by the unbanked can be linked to their demand for savings and loan services. Therefore, for successful adoption of m-banking by the unbanked, operators should promote the use of m-banking services for savings and loans. The companies should consider educating consumers through demonstrations and training to better equip them to master the m-banking systems. Once consumers feel more competent in utilizing the system, they are likely to find it easier to use and be encouraged to use it. In terms of trust, a user-friendly interface, increased network quality and recruitment of agents who can be trusted by the unbanked is likely to influence the acceptance of the m-banking services. Also, the findings indicate that building a strong brand may help to consolidate customers' confidence and elevate their trust in the m-banking system.

5. Conclusion

Transformational m-banking aims at providing banking services to unbanked people with mobile phones. The m-banking services have the potential to be transformational. However, this study concludes that the transformational potential of m-banking could be realised if beyond access, the other barriers to having a bank account are addressed. Although m-banking provides a solution to the access, documentation and affordability barriers identified; there are other barriers like economic perception, trust and compatibility that hinder its transformational potential. Furthermore, the financial needs of the customer lie at the heart of the potential for mobile transactions. In particular, if mobile is to prove transformational in delivering access to financial services, the specific needs of very low income customers must be understood in order to provide an affordable service to the unbanked.

Also, m-banking introduces new barriers (technology anxiety and risk of incorrect transfers) to the rural unbanked which are not considered in the traditional banking settings. Therefore, the transformational potential of m-banking could be significant if its implementation is compatible with existing financial and social practices of the rural unbanked (e.g. "susu" savings); potential users are given the ability to trial services; and if trust is maintained through a reliable network, while providing accessibility and convenience through the removal of geographic barriers.

In order to generalize the findings, a future study that explores quantitatively the impact of the factors influencing the rural unbanked's intention to adopt m-banking services need to be conducted. A study focusing on the impact of transformational m-banking on the norms and values of the rural society would also be useful.

6. References

Bankable Frontier Associates, (2010) "Demand study of Domestic Payments in the Phillipines" www.bankablefrontier.com Accessed 15th June 2011.

Basu, A, R. Blavy, R. and Yulek,M.(2008) “Microfinance in Africa: Experience and Lessons from selected African Countries,” IMF Working Paper 04/174 (Washington: International Monetary Fund).

Beck, T., Demirguc-Kunt, A., & Levine, R. (2005). Law and Firms' Access to Finance. *American Law and Economic Review 7* , 211-252.

Beck, T., Levine, R., & Loayza, N. (2000). Finance and the Sources of Growth. *Journal of Financial Economics 58,* , 261-300.

Bruhn, M., & Love, I. (2009). Grassroots Banking: The Effects of Opening Banco Azteca on Economic Activity in Mexico. World Bank, 2009

Burges, R., & Pande, R. (2005). "Can Rural Banks Reduce Poverty? Evidence fron the Indian Social Banking Experiment". *American Economic Review 95(3), pp.* , 780-795.

Crammer, G. &, Sjoblom, E. (2009). *Can the success of M-PESA be repeated? A review of implementations in Kenya and Tanzania. Value Bits note, http://mobileactive.org/research/can-success-m-pesa-be-repeated-review-implementations-kenya-and-tanzania, accessed 15 May 2012*

Dahlberg, T., Mallat, N., Ondrus, J., & Zmijewska, A. (2008). Past, present and future of mobile payments research: A literature review. *Electronic Commerce Research and Application* , 165-181.

DFID (2008), *"Regulating Transformational Branchless Banking: Mobile Phone and other Technology to Increase access to finance."* Focus Note, Washington. D.C CGAP, available at http://www.cgap.org/gm/document-1.9.2583/FocusNote_43.pdf

Donner,J.2008. Research Approaches to Mobile Use in the Developing World: A review of the literature. *The Information Society* , 24: 140–159.

Heyer, A., & Mas, I. (2009). Factors Affecting Uptake of Mobile Money Services: M-PESA in Kenya and Tanzania. Paper prepared for the Bill and Milinda Gates Foundation, unpublished.

Jarvenpaa, S., & Lang, K. (2005). Managing the Paradoxes of Mobile Ttechnology. *Information systems Management. Fall* , 7-23.

Klein, M. and C. Mayer (2011). M-banking and Financial Inclusion: the Regulatory Lessons" World Bank Policy Research Working Paper 5664, Washington DC

Lee, K. C., & Chung, N. (2009). Understanding factors affecting trust in and satisfaction with m-banking in Korea: A modified DeLone and McLean's model perspective. *Interacting with Computers* , 385–392.

Mas, I., & Radcliffe, D. (2010). Scaling Mobile Money. *Journal of Payment Strategy & Systems* , Forthcoming. Available at SSRN: http://ssrn.com/abstract=1681245.

Medhi, I., & Ratan, A. (2009). Mobile - Banking Adoption and Usage by Low - Literate, Low- Income Users in the Developing World. In N. Aykin, *Internationalization, Design and Global Development* (pp. 485-494). Heidelberg : Springer Berlin 5623.

Morawczynski, O., & Miscione, G. (2008). Examining Trust in M-banking Transactions in Kenya: The Case of M-PESA in Kenya. Paper presented at the IFIP WG 9.4-University of Pretoria Joint Workshop, Pretoria, South Africa.

Morawczynski, O., & Pickens, M. (2009). *Poor People Using Mobile Financial Services: Observations on Customer Usage and Impact from M-PESA.* CGAP.

Porteous D. (2006). The Enabling Environment for M-banking in Africa, report commissioned by the UK DFID," Somervile, MA.

Porteous, D. (2007). Just how transformational is m-banking?, Finmark Trust.

Suri, W., & Jack, T. (2010). *Mobile Money: The Economics of M-PESA.* Central Bank of Kenya.

Tobbin, P. (2010). Modeling Adoption of Mobile Money Transfer: A Consumer Behavior Analysis. *Mobile 4 Development.* Kampala.

Vodafone Group Plc 2007, "Transformational Potential of M-Transactions" available at: http://www.vodafone.com/content/dam/vodafone/about/public_policy/policy_papers/public_policy_series_6.pdf

Towards a model of adoption of mobile banking by the unbanked: A Qualitative Study

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Abstract

This paper presents a qualitative study on mobile banking technology acceptance by the rural unbanked. The findings suggest that convenience and affordability are antecedents of the rural unbanked perceived usefulness of mobile banking services. Whereas the number of people using mobile phones grows tremendously across the developing world; the number of people having a bank account is still very low. A recent report shows that over half the population of the world is unbanked, the majority of which are rural dwellers in the developing world. The primary aim of this exploratory study is to examine whether or not mobile banking services can be transformational. During the study, an extensive review of the literature on the unbanked and the adoption of mobile banking service ware conducted. This was followed by a focus group discussion which was conducted among the unbanked rural dwellers in Ghana. The findings of the study indicate that perceived usefulness and perceived ease of use from the Technology Acceptance Model, Economic Factor and Trust influences the rural unbankeds' intention to adopt and use mobile banking services.

Keywords: unbanked, mobile banking services, mobile money, TAM, adoption, consumer behavior

1. Introduction

The proliferation of mobile telecommunications technology has made mobile phones increasingly common and available for users even in the remotest part of the world. The introduction of pre-paid tariffs, rapid diffusion and cheap handsets from China has contributed significantly to the spread of mobile technology in developing countries. Many of the rural folks in the developing world who are deprived of basic services like banking, pipe-borne water and electricity, have access to mobile phones. The number of mobile phone users has long exceeded the number of people with bank accounts across the world (Medhi and Ratan 2009). The main interest of the present

research is in the adoption of mobile banking services by the rural unbanked. The mobile banking is defined as the delivery of financial services through mobile devices such as a mobile phone (Shen 2010).

Prior information systems studies have sought to explain and/or predict consumer behavior towards the acceptance of mobile banking services by applying theories and models from social psychology, information systems and communication streams of research (Wang, Lin and Luarn 2006, Taylor and Todd 1995, Hong, et al. 2008). Notably among them is the technology acceptance model (TAM), (Davis 1989) and the innovation diffusion theory (Roger 2003). The TAM proposes that perceived usefulness (PU) and perceived ease of use (PEOU) are the main determinants of consumers' behavioral intentions toward the use of technology. Though the TAM has received much support (Yang 2005, Luarm and Lin 2005), it has been criticized for not being exhaustive enough (Bagozzi 2007). To achieve its aim the current study draws on this theory as the theoretical lens to try and explain the behavior of the rural unbanked population towards the mobile banking services. Also, the study seeks to provide further explanation to the TAM constructs and any antecedents to a consumers' intention to adopt a technology.

The main research question is what key factors would influence the acceptance of mobile banking by the rural unbanked? To answer these questions, the current research applies a qualitative approach, specifically, focus group discussion to reveal the underlying intentions of the rural unbanked towards the use of mobile banking services. Focus Groups provide an opportunity to capture the meaning that consumers give to different aspects of reality they live in through group dynamics and interactions (Jarvenpaa and Lang 2005). Furthermore, the discussions will seek an explanation to "why unbanked" to extend knowledge on the motivational and inhibiting factors to being unbanked by the rural population.

The present study provides the findings of a preliminary study on the factors that influence the adoption of mobile banking services by the rural unbanked population in Ghana. The unique contribution of this exploratory study is in two folds. The first contribution lies in the use of a qualitative method (focus group) to identify the key factors that influence the unbanked intention

to adopt and use mobile banking services in a rural population. Secondly the present study has a theoretical contribution by providing a model that extends the existing technology acceptance models with new constructs and provides some explanation to existing constructs. The current paper will begin with a literature review on the unbanked, mobile banking and mobile banking adoption. It will be followed by the methodology used in this study. The third section details the findings of the focus group discussion. The fourth section will provide an analysis of the findings in line with the technology acceptance model and derive some propositions. A managerial implications will follow and then the conclusions.

2. Background

Rural Banking in Ghana

The government of Ghana had over the last four decades taken some policy measures to improve access to finance in rural areas. Some of these measures include the establishment of an Agricultural Development Bank (ADB) with the specific mandate of lending to agriculture and related businesses in rural Ghana, the establishment of rural and community banks in a lot of rural communities and a more recent introduction of Microfinance and savings and loan institutions. The rural banking sector in Ghana is currently dominated by three different types of institutions: the rural and community banks (RCBs), microfinance institutions which are mainly NGOs, savings and loan companies and the informal institutions like “Susu” collectors and moneylenders. As of 2011 there were 136 RCBs with a total of 568 service delivery locations and 19 savings and loan companies with 145 branches. Nevertheless, there is a huge number of the rural population in Ghana without access to formal financial services.

The informal financial sector is dominated by a range of services which are collectively called “susu”. The term susu is used collectively to include individual savings collectors, rotating savings and credit associations (ROSCAs) and savings and credit clubs run by an operator (Basu, Bilenko and Mooney 2004). Susu can be described as a form of savings outside the banking system where an amount is voluntarily saved periodically (usually daily) by a client, which is redeemed at a certain date with a small amount deducted as commission. The ROSCA susu involves members contributing savings into a pooled account periodically (usually weekly), lend a portion of the funds to individual members and share proceeds annually. Members of a ROSCA contribute money into a pooled

account which is then given to an individual member at the end of a period (e.g. quarterly). This is then rotated until all members have received their turn. The lump sum is usually used to begin a trade, pay for child school fees or bury their dead.

MOBILE BANKING

The inherent anywhere anytime and convenience characteristics of mobile technologies provide an unprecedented potential solution to the financial access problem faced by the emerging economies. The term mobile banking is defined as "banking transactions using mobile devices such as cellphones, PDAs (Personal Digital Assistants), smart phones and other devices (except for laptops)" (Lee and Chung 2009). Most mobile banking implementations have a banking application installed on users' SIM. Once signed up, an electronic account is created which enables the user to deposit money into it, withdraw money from it or transfer money from their account to other users (Tobbin 2010). It is effectively a channel whereby a customer interacts with a bank via a mobile device notably the mobile phone. It depicts the ultimate convergence of mobile technology and the broader range of banking services such as account-based savings or credit facilities. For the purpose of this study, the term mobile banking includes the various efforts to bring financial services to the unbanked using mobile phones, notably, mobile financial services, mobile payment and mobile money. Current literature on the adoption and use of mobile financial services, mobile payment and mobile money in the developing world overlap considerably.

In the developed world, most of what is termed as mobile banking is an extension of existing banking services to existing customers of the banks. The mobile phone is only used as another channel to an existing bank account (Porteous D, 2006). Porteous, (2006) distinguishes "additive" mobile banking models from the "transformational" models, and defines transformational mobile banking services as "those in which the financial product linked to the use of the phone is targeted at the unbanked, who are largely low income people". Porteous stressed that a service becomes transformational when it causes a shift in the access frontier. By additive, mobile banking complements the services offered by the banking system, such as checkbooks, ATMs, voicemail/landline interfaces, smart cards, point-of-sale networks, and Internet resources, the mobile platform offer a convenient additional method for managing money without handling cash (Donner and Tellez 2008). On the other hand, the transformational models lead to the creation of

new accounts to non banking customers. The distinction is particularly important for the industry, researchers, and for policymakers in assessing the usage and impact of the mobile banking phenomenon (J. Donner 2007). The transformational mobile banking services have increasingly been heralded as the tool for bringing financial services to the largely unbanked population of the developing countries. Hoping that by having access to financial services, the life of the people will be completely transformed. However, for this to happen the unbanked must have adopted and used the services, it is therefore important to explore the factors that enable or hinder the adoption of the services by the unbanked.

The implementations of mobile banking, mobile payment and mobile financial services in recent times have been collectively referred to as mobile money services in most deployments. Since it was first launched as SMART Money in the Philippines in 2003, at least 72 mobile money deployments have been launched across 42 developing countries (Mas and Radcliffe 2010). The implementations have taken place under many different models; some are offered entirely by banks (bank-led), others are offered entirely by Mobile Network Operators (G-Cash in Philippines; M-PESA in Kenya), still others involve a partnership between a bank and a telecommunication provider (MTN Banking in South Africa) whilst some are independently provided (Celpay in Zambia and txtnpay in Ghana) (J. Donner 2007). Although no particular model is emerging as a superior model, mobile network operator models thrive in developing markets because of their ability to reach large numbers of unbanked people in physically remote locations beyond the presence of bank and landline infrastructures. Many studies have been conducted to understand the impact of the various models of the success of mobile banking implementations. Milne, (2006) highlights the need for a good relationship between the mobile operator and the bank for a successful provision of financial services in low income countries.

Can Safaricom's M-PESA in Kenya be repeated? This is a question that many scholars and practitioners are seeking an answer to. If yes, how, if not, why not? A number of studies have been conducted recently to try and explain the unique factors that contributed to the success of M-PESA and why it has not been possible to repeat its success in any other Sub Saharan African Country. Ghana has had its fair share of attempts. There are currently three schemes of mobile banking deployments namely MTN Mobile Money, Airtel Money and Tigo Cash (Tobbin 2010). Despite all

the efforts, these mobile banking schemes have remained largely unnoticed by the customers of Ghana. Therefore understanding consumers' perception is of utmost importance for successfully providing the mobile banking services.

Mobile Banking Adoption

The adoption and use of mobile banking have the potential to extend the limited nature and reach of the formal financial sector to the poor and rural folks in Africa. However, although mobile banking for the unbanked have been deployed in 44 countries so far, there is currently scant literature on its adoption and use (Donner and Tellez 2008). Most of the existing literature is from the developmental/practitioners' arena with a few scholarly researches emerging (Porteous D, 2006); (Ivatury & Pickens, 2006); (Mas and Kumar 2008); (Mas and Radcliffe, Scaling Mobile Money 2010); (Mas and Morawczynski 2009); (Dermish, et al. 2011).

Despite the fact that most of the studies from the practitioners are not peer reviewed, they provide valuable information on actual usage and contextual information on the development and use of the phenomenon. For example, Ivatury & Pickens (2006) provided valuable insight into the characteristics of the early adopters of WIZZIT, one of the first major initiatives dedicated to offering mobile banking to the poor in South Africa. Also significant are the ethnographic work of Olga Morawczynski during 18 months stay in Kenya (O. Morawczynski 2008); (Morawczynski and Pickens 2009, O. Morawczynski 2009, Morawczynski and Krepp 2011). Morawczynski O. , (2011) theses provided significant insight into the adoption, use and impact of M-PESA in Kenya. However, there is still a shortage of studies that properly conceptualizes why the unbanked and the poor adopt mobile banking, birthing key determinants of mobile adoption by the unbanked. Furthermore, Donner & Tellez (2008)criticized the lack of scholarly research on adoption and impact of mobile banking in the developing world and called for studies that consider the social, economic and cultural environments within which such systems operate (Donner and Tellez 2008).

More scarcely is the application of existing technology innovation acceptance models and theories like the Technology Acceptance Model (TAM) (Davis 1989) and Rogers' Innovation Diffusion Theory (IDT) to examine the adoption of mobile banking by the unbanked. This is contrary to the extensive use of models and frameworks to examine the consumer acceptance of additive mobile banking applications (Chung and Kwon 2009); (Gu, Lee and Suh 2009); (Luarm and Lin 2005); (Yu and Fang

2009). By applying the traditional technology acceptance models and frameworks to the adoption of transformational mobile banking services, we aim at bringing the discussion to the mainstream information systems literature. The theoretical background of this study is thus drawn from the Technology Acceptance Model (Davis 1989).

TECHNOLOGY ACCEPTANCE MODEL

Among the various models and frameworks used in Information systems literature to examine the determinants of computer technology acceptance and utilization, Davis' TAM is the most widely accepted (Luarm and Lin 2005). The Technology Acceptance Model (TAM) is established on the premises that the contracts, perceived usefulness and perceived ease of use are fundamental determinants of system adoption and use (Davis 1989). These two beliefs create a favorable disposition or intention towards use and consequently affect its use. Perceived Usefulness (PU) is said to be the degree to which a person thinks that using a particular system will enhance his or her performance. Also, Perceived Ease of Use (PEOU) is "the degree to which a person believes that using a particular system will be free of effort" (Davis 1989). A number of measures have been used for the PU and PEOU constructs (Davis 1989); (Legris, Ingham and Collerette 2003); (Venkatesh, Morris, et al. 2002). The measures of PU include performance increase, productivity increase, effectiveness, overall usefulness, time saving and increased job performance. Also measures for PEOU have included, ease of control, ease of use, clarity, and flexibility of use (Dahlberg, Mallat, Ondrus, & Zmijewska, Past, present and future of mobile payments research: A literature review, 2008). These instruments have been well validated in a number of studies (Mathieson 1991); (Taylor and Todd 1995); (Hsu and Lin 2008). Furthermore, a number of recent studies have adopted the TAM constructs to study the acceptance of internet and mobile related technologies, such as mobile payments, mobile banking, m- commerce(Kim, Mirusmonov and Lee 2010); (Schierz, Schilke and Wirtz 2010). Therefore using TAM as a basis to study the acceptance of mobile banking by rural unbanked consumers is highly valid approach. Various modifications and extensions have been proposed since it was introduced by (Davis 1989). There have been calls for more determinants of adoption that considers the emotional and social aspects of technology acceptance (Bagozzi 2007).

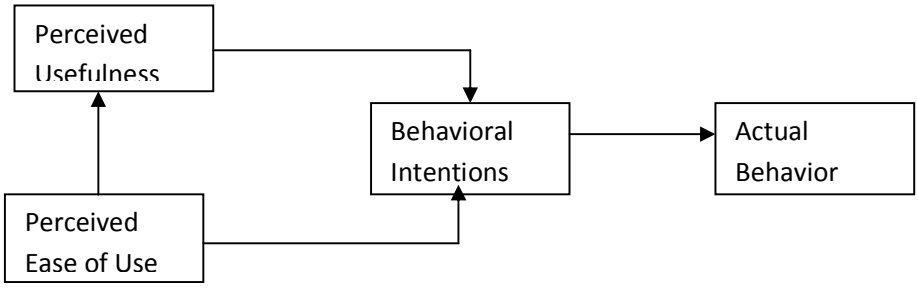

Figure 1: Technology Acceptance Model

TAM has received praises from earlier researchers on its contribution towards our understanding into consumer behavior. Lu et al. (2005, p.207) states that: "Throughout the years, TAM has received extensive empirical support through validations, applications and reapplications for its power to predict use of information systems". Also, Legris, Ingham, & Collerette, (2003, p. 202) conclude that "TAM has proven to be a useful theoretical model in helping to understand and explain user behavior in information system implementation".

The Technology Acceptance Model and its predecessor Theory of Reasoned Action (TRA) have had their fair share of criticisms. TAM is most often used in work-related contexts that do not imply any cost to the user (Nysveen, Pedersen and Thorbjørnsen 2005). And also, the model seems to be too parsimonious, with fairly general constructs (Doll, Hendrickson and Deng 1998). Some other critics like Bagozzi, (2007) criticize TAM for having a deterministic cause-effect approach and for neglecting group, social and cultural aspects of decision making. By deterministic, the critics of TAM stress that TAM presupposes that once there is perceived usefulness and perceived ease of use, the intention will be formed which will inevitably lead to use. Furthermore, Bagozzi, (2007) suggested that better contributions to the TAM which finds the antecedents of the PU and the PEOU constructs are needed to further explain the effect of these beliefs on behavioral intentions. Also, to solve the problem of the use of deterministic models, Biljon, Kotze, & Marsden, (2007) calls for a more complex approach that incorporates qualitative factors such as different world views and technological frames of reference. Furthermore, decisions by the unbanked and the poor in adopting mobile banking is likely collaborative or collective. Therefore, the potential impact of social influence in accepting such new technology by the unbanked cannot be overemphasized.

3. Research Methodology

The main purpose of this qualitative research is to find out the deeper motivations and associations that underlie an unbanked consumer's intentions to adopt mobile banking services. Money, banking, and previous studies have shown that focus group discussion is a good methodology for studying innovative mobile services (Jarvenpaa and Lang 2005). The use of open-ended questions in the group discussions allowed participants to explain, comment and share experiences, attitudes, opinions, and beliefs, with specific focus on the consumer (his cognition and emotions as a result of the consumption intentions). Focus Groups provide an opportunity to capture the meaning that consumers give to different aspects of reality they live in through group dynamics and interactions. For example, Mitchell, (1998) highlights the different sort of data on peer group structures that she generated by employing focus groups, suggesting that focus group allowed for a more detailed understanding of her research topic. Furthermore, Dahlberg, Mallat, Ondrus, & Zmijewska, (2008) posited that qualitative studies on adoption are needed to help reveal further details about the adoption factors identified in previous research. The meaning that consumers give to a phenomenon is shaped by their interactions and different perspectives. This research method is employed widely in marketing and consumer behavior research, but its application in consumer early adoption of technology decision making is novel.

The group sizes varied from 8 to 12 with a total of 97 unbanked rural dwellers participated in eight focus group discussions held in three different communities in Ghana (Yawkoko, Akorley Anti, Akorley waterworks, Wassaman, Asukesu and Heman). The communities have no electricity or pipe borne water except Yawkoko and Esukesu which had electricity but no water. The distances between the communities and their respective nearest bank were approximately 5km. Participants were selected by random sampling through open recruitment, however, in order to foster successful interactions and group dynamics some level of stratification was employed in grouping them. Members of each group were either friends or neighbors. Although the core of each group was between 8 and 12, other members of the community were allowed to join usually validating the responses from the core group.

Although mobile banking has been introduced in Ghana since 2009 by MTN it was still quite new to most people especially in the rural areas. An initial introduction and demonstration of the mobile

banking service is given prior to the discussions. This was to enable the users appreciate the services available on an existing mobile banking platform and to foster the interactions between the participants. Two registered mobile banking accounts for Airtel Money were used for the demonstration.

The discussions followed a semi-structured guide which we developed from the secondary research on adoption from the existing information systems literature. Although the key constructs in TAM and its various extensions were used as a basis for the discussions, key determinants of intention to adopt were sought from participants. Each session took approximately one and a half hours. The discussions were moderated by the researcher with an assistant who took care of video recording the discussions and making some notes as well. In order to ensure that the participants are able to express themselves freely, a local dialect, Twi was adopted for the discussions. All participants were quite fluent in Twi. The focus group interviews were recorded, and the researchers themselves transcribed the recordings to ensure the quality of the data. The transcripts were coded, the codes were partly based on the antecedents to intention to use technology (TAM) introduced by Davis, (1989) and partly based on extensions to the technology acceptance model (TAM) discussed in literature. Other new codes emerged from the discussions. The following section is structured along the codes developed with a further link between the codes which are identified to reveal any antecedents to the key contracts in the technology acceptance model.

4. Findings

The field study among the rural dwellers revealed some important perceptions that affect early adoption of the technology among this section of the population. All participants had very little knowledge of the mobile banking schemes available in Ghana. Although, the majority of the participants have heard of mobile banking through MTN advertisements, only 3 out of the 91 participants have had an experience with any mobile banking service. Most participants in the groups have knowledge of basic financial terms such as Savings, Loans, insurance and interest. Agents from the rural banks and other financial institutions have been the source of this knowledge.

DESCRIPTION OF PARTICIPANTS

The participants of the current research were mainly rural dwellers whose main occupation was farming. There were a few traders, who sold foodstuff and other basic necessities in the communities. The traders were largely women whose husbands were farmers and sold basic amenities as an additional source of livelihood. The sample was made up of 63% Male and 37% female and about 57% below 40years. With regard to education, the majority of them had basic to no formal education, with only 10% being able to read and write. Among the female participants there were only two who could read and write. The size of their farms ranged from 1 acre to 6 acres with the majority of them below 3 acres. To make it simpler for the participants, the local currency was used for the study. On average the participants earned below GH₵80 a month. At the time of the study, $1 was exchanged for GH₵1.6, approximately. Thus, about 73% of the respondents earned less than $50 per month. Apart from it being low, their earnings were also volatile, depending on the rains. The few traders reported higher earnings than the farmers making farming less lucrative than trading in these communities.

Table 1: Characteristics of Participants

	No. of Participants	Land Ownership	Female	Male
AKorley Waterworks	10	0	3	7
Akorley Ayiti	12	4	4	8
Yawkoko	9	5	4	5
Teacher Mante	9	0	2	7
Asukesu	10	6	2	8
Wassaman	10	5	3	7
Heman	9	4	3	6

BANK ACCOUNT

This part of the discussion was geared towards getting an understanding of why the unbanked did not have an account and what could cause them to open one. This discussion was to access whether mobile banking is indeed the solution to bringing financial services to the unbanked. Although the study targeted the unbanked, there were some who were previously banked and others who were under-banked (have an account but not currently operating it properly). However, the majority (85%) of the participants had never opened a bank account. However, they had all taken part in a susu. Among the few that were banked, most of them had an account with a

rural bank and only two had an account with a commercial bank. However, all the banked participants were considered to be under-banked because they reported not using the account because of lack of funds. When asked "why not use a bank?" majority of the participants cited lack of funds, accessibility, trust, and volatility of funds as the main reasons for not using a bank. The majority of the rural unbanked perceives that a formal job is required for opening a bank account. Furthermore, they believe that you must have a reasonable amount of money before you can open an account. Access-related reasons are the next most important explanation for being unbanked. Although, the banks are within 4-8km from the Akorley Waterworks, Akorley Anti, Yawkoko and Teacher Mante communities, all considered the issue of distance as a major deterrent for having a bank account.

However, when asked *"if a bank is opened in your community will you open an account?"* they all responded affirmatively. And the discussion changed from "we have no money to open a bank account" to "if the bank is close by, then any little money that you get can be taken to the bank". Although their first reason for not having a bank account was based on the lack of surplus funds, participants are eager to become banked if the access barriers were removed. This supports the hypotheses that increased access to banking services would lead to more people becoming banked. However, these findings suggest the importance of addressing underlying economic perceptions and realities and not only the access barriers if financial inclusion is to be achieved. Another very important set of reasons given for being unbanked were trust-related. A number of the participants do not trust the banks to give them their money when they need it.

When participants were asked, If you had sufficient money, what would encourage you to open a bank account? 75% responded that if there was access to cheap loans, 15% said if there was high interest on savings and others mentioned low bank charges as incentives to being banked. The participants of Akorley Anti community insisted that any banking facility to be established in their community must be prepared to give them loans. Overall participants were aware of the importance of savings irrespective of gender or age. Whereas some participants had reservations about taking loans, all participants agreed on the importance of savings.

MOBILE BANKING

The mobile banking questions sought to assess participants awareness of the mobile money services introduced in Ghana and whether or not they would patronize the services when introduced in their communities. About 85% of the participants were unaware that mobile banking services were available. In some cases for example in Yawkoko and Wassa, although they had heard of it through an MTN radio/TV adverts, they had not been clear on how the services operate or how they could take advantage of it. They stressed that a demonstration and training on how the services work would be necessary for its adoption and use by their communities. In Teacher Mante, a participant had used a similar service where call units were bought by her sister in the city and transferred to her who in turn, sold the units to others for cash.

Having seen a demonstration, listened and discussed the benefits of mobile banking services including the cash-in, cash-out, savings, payments and loans, the majority of the participants generally warmed up to this new concept and were anxious to try the services and to explore the benefits to be gained. Among the services explained to the participants, the ability to use the mobile phone to save and be able to cash-out the money whenever they needed it was what interests them most.

When asked what would motivate them to take up mobile banking? The majority of the participants emphasized on time saving and convenience. Other motivations cited included, affordability, ease of use, high interest on savings, availability of cash, guaranteed network availability and security of funds. Interestingly, participants from Akorley Anti insisted that their main motivation would be access to loans.

Persistent network fluctuation, unavailability of funds from the agents, the effect of loss of mobile phone, unauthorized use and the fear of mistakenly transferring funds to the unknown were some of the few barriers to using the services that were discussed. A participant from Yawkoko argued that there were instances when mobile network services in their community were down for almost 72 hours, “what happens when you need some of your savings during this time”?. Although participants debated on the validity of the 72 hours downtime, they all agreed that the unreliability of the network was a major deterrent to the use of the mobile banking services. The issue of what happens to the consumer who need money, when the network is down was discussed in all the

group sessions. The participants from Heman gave examples of network reliability issues and how it affects the trust in mobile communication in general. Participants also discussed the availability of documentation and records of transactions in the form of a text. Furthermore, some of the participants were worried about mistakenly transferring funds to unknown recipients and cited how they have been mistakenly called the unknown numbers as an example. As one participant from the Wassa group noted:

"what happens if I mistakenly transfer money to an unknown recipient?"

The participants were asked to indicate who they trust to keep their money, a mobile operator or a bank? Surprisingly, the majority of the participants trust the mobile network operator over the banks. The majority stressed that they were more likely to find the mobile operator anywhere they go in Ghana than the bank (mostly referring to the rural bank). The existing trust in the operator stems from the established relationship through their use of the mobile phone. Those who trusted the banks more than the mobile operator argued that the banks were more established and had relevant structures to ensure that they kept the funds than the mobile operators. The level of education of those who trusted the mobile operator more than the bank was lower than the others.

When participants were asked if in their opinion they believe the services would be easy to use, they responded yes. Moreover, they expressed the need for further awareness and training and explained that with some level of training they would be able to use it without problems. Most of the participants in the current study use their mobile phone for only making and receiving calls. This led to a discussion on the usage of the services by the aged population. How are they likely to find the mobile banking service easy to use? Although most participants were confident in their ability to use the services, it was observed that gender and age influences their perceived ease of use. The younger male participants were more confident in finding the mobile banking service easy to use.

5. Discussions

The findings of the current research explicate the demand for transformational mobile banking services. Participants from the various communities studied, showed support for the introduction of these services in their communities. However, the ranking of their demand for the services are quite different from the traditional deployment of mobile banking services (International Finance Corporation 2010). Savings and Loans seem to be the most important service followed by transactions, money transfer/remittance and then bill payments. This is quite different from the current deployments of mobile banking which concentrates on Air time top-up, money transfer and bill payments (Tobbin 2010). The majority of the participants have no regular bills to pay; they have no electricity bill, gas bill, water bill or telephone bill. Thus the findings of the current study show that the demand for mobile banking services can be increased by providing savings and loan services and by creating awareness of the other basic services like money transfer and remittances (Dass and Pal 2009).

The exploratory field study among the rural unbanked provided some important additional explanations for the consumer adoption of mobile banking services by this segment of the population. Although a qualitative data cannot be used to test statistically the TAM model, the findings supports the explanatory prowess of its Perceived Usefulness and Perceived Ease of Use constructs. Furthermore, the findings also provide some insight into the antecedents of these constructs and thereby provide some answers to the criticisms of the TAM model discussed earlier. Also, the findings provide indications of additional factors that may affect consumer behavioral intentions towards mobile banking services which is in support of the calls from Agarwal & Prasad, (1998) and Mathieson, (1991) about the need for TAM to be extended to include additional factors for improvement of its specificity and explanatory utility. The additional determinants identified in the current study include; Economic Factor and Perceived Trust.

PERCEIVED ECONOMIC FACTOR

The economic factor refers to the availability of surplus money being a determinant to adopting mobile banking. Literally, if the lack of money is the most significant reason for being unbanked, then the introduction of mobile banking will not necessarily lead to banking the unbanked. However, although participants overwhelmingly attributed their being unbanked to lack of money,

they also significantly indicated that they have been saving, suggesting that the economic factor may only be that of perception not reality. Therefore, the lack of money response can be linked to their perceived amount of money required to be banked (open and managed a bank account). This was also evidenced in their response to "if you get huge sums of money, will you open a bank account" question, to which they all answered affirmative. The rural unbanked has a wrong perception about the amount required to open a bank account. This may stem from the historical experience of some members of the rural communities. In the recent past, opening a bank account would require a certain amount of deposit below which you are not allowed to withdraw unless you opt to close the account. There are still a number of banks in Ghana who require an initial deposit for certain accounts. Although, initially the economic factor seemed to have significant influence on the rural consumers' intention to use mobile banking, through financial awareness and training this perception can easily be removed since most mobile banking implementation does not require initial deposit. However, in general, low levels of surplus income could negatively affect the consumer behavioral intentions to use mobile banking services.

PERCEIVED USEFULNESS

As far as the findings relating to the perceived usefulness of the mobile banking services are concerned, the participants found savings through mobile banking to be the most useful. The participants showed an intention to use the services when introduced and perceived usefulness was found to have a positive influence on this intention. The effect of perceived usefulness on adoption was evidenced in their discussions of the hardship among the population in accessing banking and financial services. The findings show that the overall usefulness of the mobile banking services could be realized in its convenience, and affordability facets. This finding supports the results of many earlier adoptions of mobile banking studies.

In relation to mobile banking, the concept of convenience can be described in two different dimensions. The time dimension and the place dimension were both discussed in the findings of the current study (Yoon and Kim 2007). The mobile banking services provide the rural unbanked with an ability to use banking services at their own convenient time. Furthermore, the convenience place dimension means that consumers are able to use the banking services within their communities. The findings point out that the unbanked's assessment of the usefulness of the

mobile banking services could be influenced by their perceived convenience. Past studies have also identified convenience as an important factor in the success of mobile commerce (Xu and Gutierrez 2006). Eastin, (2002) in a study of an analysis of four e-commerce activities including shopping, banking, investing and online services found perceived convenience to significantly predict consumers' intention to adopt. Also, in a recent study of factors that influence the intentions to use mobile payment, Kim et al. (2010), concluded that perceived convenience has a positive and significant influence on perceived usefulness. We therefore proposed that the rural unbanked's perceived convenience of the mobile banking services is an antecedent to its perceived usefulness of the services.

Another factor that affects the perceived usefulness of mobile banking services to the rural unbanked is affordability. In places where people had to spend GH₵4 to travel a distance to save or withdraw money, the perceived usefulness of the mobile banking services could be influenced by affordability. Another dimension of affordability identified among the rural unbanked is the concept of initial minimum deposit. The existence of such a requirement could affect the unbanked affordability of opening an account and hence their perceived usefulness of the services. The link between the rural poor's perceived usefulness of mobile banking and its affordability has been established in some recent studies of mobile financial services (The Mobile Financial Service Report, 2011; Ivatury & Pickens, 2006). We therefore proposed that the rural unbanked assessment of the affordability of mobile banking services can influence their perceived usefulness of the services.

PERCEIVED EASE OF USE

Perceived ease of use is the extent to which an individual believes that using a technology will be free of effort. The current study found ease-of-use of mobile banking services to be a very critical factor affecting its adoption and use among the rural unbanked population. Since the rural unbanked's usage of mobile phones in general is at the early stages, an average of 3 years experience and mostly on making and receiving calls, ease-of-use is expected to be more salient and should strongly affect their behavioral intentions (Venkatesh 1999). Furthermore, some level of literacy is required to be able to effectively use most of the mobile banking services launched so far. At its basic appearance, the user must be comfortable with going through the menu items on

the SIM Toolkit (STK). However, after a brief demonstration and explanations, most of the participants of the current study perceived the STK not to be difficult to understand, learn and operate.

The findings of the current study indicate that, the level of knowledge (awareness) of the mobile banking services is a determinant of the perceived ease of use of the service. The increased awareness of the mobile banking services influenced their perception of its ease of use. One could argue that the affirmative answer given by the participants to the question on ease of use was because of the demonstration and explanations given before the discussions. The rural unbanked who has more knowledge about mobile banking services are more likely to find it easier to use than those who lack such knowledge. Thus, we propose that mobile banking knowledge will have a positive effect on the perceived ease of use of mobile banking by the unbanked. There are some demographic factors that can influence the perceived ease of use. Age and gender were identified in the findings to influence the participants' perceived ease of use.

PERCEIVED TRUST

Despite the unique benefits of mobile banking enumerated, overcoming trust issues is a major challenge to the adoption of any mobile service. Numerous recent researches indicated that trust is a key determinant of consumers' behavioral intentions towards the adoption of mobile banking services (Gu, Lee and Suh 2009, Donner and Tellez 2008). When it comes to the issue of trust and the rural unbanked, we identified three levels of complexities, firstly, the trust of the unbanked on technology being offered; then the trust of the MNO and finally, the trust of the agents. The trust of the technology could be based on their trust of the mobile banking interface on their handset and their trust of the network that carries the transactions; this trust is built over past experiences (Maurer 2008). The findings of the current study point out that persistent network fluctuation and complex application interfaces can affect the rural unbanked trust in the mobile banking services.

Another level of complexity of trust was based on an institutional level of trust. Most participants have had some relationship with a mobile operator and not with a bank. Also, the mobile operator (e.g. MTN) has a presence that is much more visible (through advertisements) than the rural bank. And the average rural unbanked identify themselves with their mobile operator's brand. When asked, "why do you trust MTN?" a participant responded, because MTN is everywhere. These

factors influence their expectations in the institution and hence their level of trust. In a similar study by Morawczynski, (2008) in Kenya, it was observed that the customers' trust in Safaricom (MNO) was transferred to MPESA. It can therefore be argued that the trust developed in the use of mobile phones for receiving and making calls can be translated to mobile banking services. Finally, the findings also suggest that the adoption of the services by the unbanked could be influenced by trust in the agents. The interpersonal level of trust is built through the individual relationship between the customer and the agent.

THE PROPOSED MODEL AND PROPOSITIONS

Proposition 1: Perceived Economic Factor (PEF) has a significant and direct effect on the rural unbanked intention to adopt mobile banking services

Proposition 2: Perceived Usefulness has a significant and direct effect on the rural unbanked intention to adopt mobile banking services

Proposition 3: Perceived Ease of Use has a significant and direct effect on the rural unbanked intention to adopt mobile banking services

Proposition 4: Perceived Trust has a significant and direct effect on the rural unbanked intention to adopt mobile banking services

Proposition 5: The rural unbanked Perceived Usefulness is determined by the level of convenience (con) and affordability (aff) derived from the mobile banking services

Proposition 6: The age and gender of the rural unbanked affect their Perceived Ease of Use of the mobile banking services

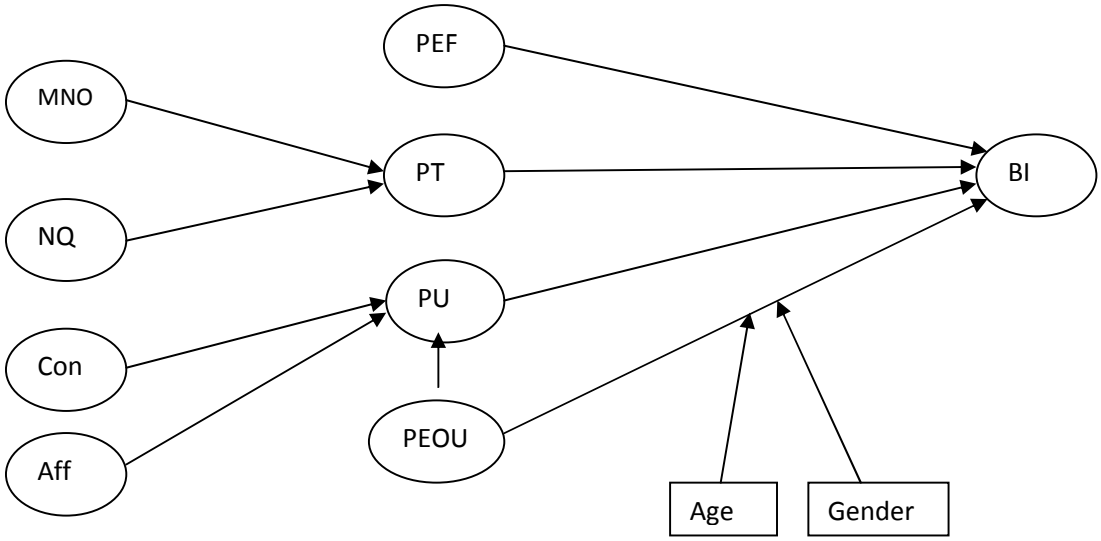

Figure 2: Proposed extended TAM for Mobile Banking

MANAGERIAL IMPLICATIONS

The present findings also carry implications for industrial practitioners. The demand for mobile banking services by the unbanked can be linked to their demand for savings and loan services. Therefore, for successful adoption of mobile banking by the unbanked, operators should promote the use of mobile banking services for savings and loans. The corporate, should further consider educating consumers through demonstrations and training to better equip them to master the mobile banking systems. Once consumers feel more competent in utilizing the system, they would find it easier to use and will be encouraged to use it. In terms of trust, a user-friendly interface, increased network quality and recruitment of agents who can be trusted by the unbanked will influence their acceptance of the mobile banking services. Also, the findings indicate that building a strong brand will consolidate customers' confidence and elevate their trust in the mobile banking system.

6. Conclusion

The mobile banking services have the ability to be transformational. The findings indicate that it is possible for these services to bank the unbanked. However, to be successful, the barriers that inhibited their ability to be banked in the traditional method of brick and mortal need to be removed through the spatial and temporal characteristics of the mobile technology. Also, to be useful to the unbanked, the mobile banking services must be affordable and provide the rural

unbanked the necessary convenience that it promises. In general, the findings revealed two additional variables (Economic factor and perceived trust) to the TAM that can influence the rural unbanked's intention to accept the mobile banking technology. Furthermore, affordability and convenience were found to be determinants of perceived usefulness whilst mobile knowledge, age and gender were also found to affect perceived ease of use. However, to generalize the findings, a confirmatory study that covers the key constructs identified in this study.

7. References

Agarwal, R, and J Prasad. "The antecedents and consequents of user perceptions in information technology adoption ." *Decision Support Systems 22(1)*, 1998: 15-29.

Aker, J, and I Mbiti. ""Mobile Phones and Economic Development in Africa"." *Journal of Economic Perspective*, 2010.

Bagozzi, R.P. "The legacy of the technology acceptance model and proposal for paradigm shift." *Journal of the association for information systems, 8(4)*, 2007: 244-254.

Basu, S, M Bilenko, and R Mooney. "A Probabilitic framework for semi-supervised clustering." 2004.

Biljon, J.A, P Kotze, and G Marsden. "Motivational Needs-Driven Mobile Phone Design." *INTERACT 2007.* 2007. 523-526.

Chung, N, and S Kwon. "The effects customers' mobile experience and technical support on the intention to use mobile banking." *Cyber Psychology & Behavior, Vol. 12(5)*, 2009: 33-35.

Dahlberg, Tomi, Niina Mallat, Jan Ondrus, and Agnieszka Zmijewska. "Past, present and future of mobile payments research: A literature review." *Electronic Commerce Research and Application* (Elsevier B.V. Doi), 2008: 165-181.

Dass, R, and S Pal. *Feasibility and Sustainability Model for Identity Management.* Ahmedabad: Indiana Institute of Management , 2009.

Davis, F. "User Acceptance of Computer Technology:A comparison of Two Theoretical Models." *Management Science Vol. 37, No. 8*, 1989: pp. 982- 1002.

Dermish, Ahmed, Chritoph Kneiding, Paul Leishman, and Ignacio Mas. ""Branchless and Mobile Solutions for the Poor: A survey" mimeo." 2011.

Doll, W.J, A. Hendrickson, and X Deng. "Using Davis's perceived usefulness and ease of use instruments for decision making: A confirmatory and multigroup invariance analysis." *Decision Science*, 1998: 839–870.

Donner, J, and C.A Tellez. "Mobile banking and economic development: Linking adoption, impact and use." *Asian Journal of Communication 18(4)*, 2008: 318-322.

Donner, J. "Research Approaches to Mobile Use in the Developing World." 2007.

Eastin, M.S. "Diffusion of e-commerce: an analysis of the adoption of four e-commerce activities." *Telematics and Informatics, 19*, 2002: 251-267.

Gu, J, S Lee, and Y Suh. "Determinants of behavioural intention to mobile banking." *Expert Systems with Applications, vol. 36*, 2009: 11605-11616.

Hong, S.J., J.Y. Moon, K.Y. Tam, and J.Y.L. Thong. "Understanding the behavior of mobile data services consumers." *Info Sys Front 10*, 2008: 421-445.

Hsu, C.L, and J.C.C Lin. "Acceptance of blog usage: the roles of technology acceptance, social influence and knowledge sharing motivation." *Information & management, 45(1),*, 2008: 65-74.

International Finance Corporation. *Mobile Banking in Indonesia.* IFC, 2010.

Ivatury, G, and M Pickens. "Mobile Phone Banking and Low Income Customers: Evidence from South Africa." CGAP, World Bank and United Nations Foundation, Washington, DC, 2006.

Jarvenpaa, S, and K Lang. "Managing the Paradoxes of Mobile Ttechnology." *Information systems Management. Fall*, 2005: 7-23.

Kim, C, M Mirusmonov, and I Lee. "An empirical examination of factors influencing the intention to use mobile payment." *Computers in Human Behavior*, 2010: 310-322.

Lee, Kun Chang, and Namho Chung. "Understanding factors affecting trust in and satisfaction with mobile banking in Korea: A modified DeLone and McLean's model perspective." *Interacting with Computers*, 2009: 385–392.

Legris, P, J Ingham, and P Collerette. "Why do people use information technology? A critical review of the technology accepted model." *Information & Management, 40(3)*, 2003: 191.

Lu, J., J.E. Yao, and C.S. Yu. "Personal Innovativeness, social influences and adoption of wireless Internet services via mobile technology." *Journal of Strategic Information systems*, 2005: 245-268.

Luarm, P, and H.H Lin. "Towards an Understanding of the behavioural intention to use mobile banking." *Computers in Human Behaviour, Vol 21 No. 6*, 2005: 873-91.

Mas, I, and K Kumar. *Banking on Mobiles: Why, How, for Whom?* Washington DC: CGAP, 2008.

Mas, I, and O Morawczynski. "Designing Mobile Money Services: Lessons from M-PESA." *Innovation: Technology, Governance, Globalization 4(2)* , 2009: 77-99.

Mas, Ignacio. "An Analysis of Cost Savings through Mobile Money Platforms." 2011.

Mas, Ignacio, and Dan Radcliffe. ""Scaling Mobile Money"." *Bill and Melinda Gates Foundation*, 2011.

Mas, Ignacio, and Daniel Radcliffe. "Scaling Mobile Money." *Journal of Payment Strategy & Systems* (Bill & Melinda Gates Foundation), 2010: Forthcoming. Available at SSRN: http://ssrn.com/abstract=1681245.

Mathieson, K. "Predicting user intensions: Comparing the technology acceptance model with the theory of planned behavior." *Information systems Research, 2(3)*, 1991: 173-191.

Maurer, B. "Retail electronic payments systems for value transfers in the developing world." 2008.

Medhi, I, and A Ratan. "Mobile - Banking Adoption and Usage by Low - Literate, Low- Income Users in the Developing World." In *Internationalization, Design and Global Development*, by N. Aykin, 485-494. Heidelberg : Springer Berlin 5623, 2009.

Milne, C. "Improving affordability of telecommunications: cross-fertilisation between the developed and the developing worl." *Telecommunications Policy Research Conference.* Virginia: George Mason University, 2006.

Mitchell, W.F. "The path to full employment and equity,." *The Economic and Labour Relations Review, Supplement to Volume 11,*, 1998: 69-88.

Morawczynski, and Krepp. "Saving on the mobile: developing innovative financial service to suite poor users." 2011.

Morawczynski, O. "Saving Through the Mobile: A Study of M-PESA in Kenya. I." In *Advanced Technologies for Microfinance: Solutions and Challenges*, by A. AShta. Hershey: IGI Global, 2011.

Morawczynski, O. *Surviving in the 'dual system': How M-PESA is Fostering Urban -to-Rural Remittances in a Kenyan Slum.* Pretoria, South Africa: HCC8, 2008.

Morawczynski, O, and M Pickens. *Poor People Using Mobile Financial Services: Observations on Customer Usage and Impact from M-PESA.* CGAP, 2009.

Morawczynski, Olga. *Exploring the usage and impact of transformational m-banking: The case of M-PESA in Kenya.* mimeo, 2009.

Nysveen, H, P.E. Pedersen, and H Thorbjørnsen. "Intentions to use mobile services: antecedents and crossservice." *Journal of the Academy of Marketing*, 2005: 330–346.

Porteous D. "The Enabling Environment for Mobile Banking in Africa, report commissioned by the UK DFID," Somervile, MA." 2006.

Porteous, D. "Financial Service Access and Usage in Southern and East Africa." 2007.

Roger, E. *"Diffussion of Innovation".* Free Press, 2003.

Schierz, P.G, O Schilke, and B.W Wirtz. "Understanding consumer acceptance of mobile payment services: An empirical analysis." *Electronics Commerce Research and Applications, 9(3)*, 2010: 209=216.

Shen. "Technology mediation in service delivery." 2010.

Suri, William, and Tavneet Jack. "Mobile Money: The Economics of M-PESA." Central Bank of Kenya, 2010.

Taylor, S, and P.A Todd. "Understanding information technology usage: a test of competing models." *Information Systems Research 6,*, 1995: 144-176.

"The Mobile Financial Service Report." 2011.

Tobbin, Peter. "Modeling Adoption of Mobile Money Transfer: A Consumer Behavior Analysis." *Mobile 4 Development.* Kampala, 2010.

Venkatesh, V. "Creating favorable user perception: Exploring the role of intrinsic motivation." *MIS Quarterly. 23(2)* , 1999: 239-260.

Venkatesh, V, M.G Morris, G.B Davis, and F.D Davis. "User acceptance of information technology: Toward a unified view1." *MIS Quarterly, 27(3)*, 2002: 425.

Wang, Yi-Shun, Hsin-Hui Lin, and Pin Luarn. "Predicting consumer intention to use mobile service." *Information Systems Journal, Vol. 16 No. 2*, 2006: 157-79.

Xu, G, and J.A Gutierrez. "An exploratory study of killer applications and critical success factors in m-commerce." *Electronic Commerce in Organizations 4(2006)*, 2006: 63-79.

Yang. "CDMA Ad Hoc Networks: Design and Performance Tradeoffs." 2005.

Yoon, and Kim. ""A cross cultural study on the value structure of mobile internet usage: comparison between Korea and Japan"." *Journal of Electronic Commerce Research, Vol. 3 No. 4*, 2007: 227-39.

Yu, T, and K Fang. "Measuring the post-adoption customer perception of mobile banking services ." *Cyber Psychology & Behavior, Vol.12(1)*, 2009: 33-35.

A Qualitative Investigation of Use and Adoption of Mobile Money in Kenya: A Domestication Approach

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Abstract: The paper introduces original research findings and conclusions from a qualitative analysis of use and adoption of mobile money in Kenya using the domestication approach. We applied the dimensions of domestication as an analytic tool to explain the acquisition, incorporation and conversion of the mobile money technology in the everyday life of its users. The data gathered includes a series of focus group discussions semi- structured interviews and participatory observations with members of the Machakos District in Kenya. It identifies satisfaction as an important mediator between the incorporation and conversion phases of the domestication process. Further, it presents findings that provide empirical support that adoption can be best explained as a process, which includes an initial appropriation, consumption and adoption and shows the influence of social networks, daily practices, and norms, in all phases of the adoption process.

Keywords: Adoption, Use, Domestication, Mobile Money, Kenya, Mobile Banking, Appropriation

1. Introduction

The adoption and use of mobile cellular technologies have been recorded in literature as the most rapidest spread of consumer-level technology in history (Jack & Suri, 2011). With the current 5.9 billion mobile cellular subscriptions, the global penetration reaches a staggering 87% in general and 79% in the developing world (ITU, 2011a). There has been a remarkable growth in the digital mobile phone services market in the last decade. This is as a result of the establishment of the global system for mobile communication (GSM) and code division multiple access (CDMA) technologies. This rapid growth could be partially attributed to the human social need for interaction, which is fulfilled by the mobile phone. And partially due to reduce communication costs in many parts of the developing world. Fixed telephones have offered many of the same benefits for decades (R. J. Saunders et al., 1983), but in many cases have been unaffordable or

simply unavailable to the rural dwellers that form a greater percentage of people living in developing countries. The mobile technology has enabled the poorest countries to develop their telecommunication network coverage to the mass of its population including the rural poor (Duncombe & Boateng, 2009). Reports show that many of the rural poor are using their limited resources on acquiring mobile handsets and airtime (Tobbin, 2010).

Rapidly, it was realized that the mobile phone was more than just a communication tool and that it can be used for many other services. This had led to increase in the application of mobile phones for developmental projects in most developing countries. The current literature about mobile for development has records of mobile applications in health (J. Aker & Mbiti, 2010), environmental and disaster relief (Samarajiva, 2005), agriculture (Donner & Tellez, 2008), and financial services (Tobbin, 2010) primarily aimed at improving the life of rural dwellers in the developing economies. For example, (Jenkins, 2008) gave an account of, how rural Indian fishermen adopted mobile phones to increase their net wealth. Further, Samarajiva (2005) gave an account of how mobile phones were used in the provision of disaster relief during the 2004 tsunami. One of such applications is mobile money (Porteous, 2006).

Since its first launch in Philippines in 2003, the mobile money services have been beckoned as the tool to bring financial services to the unbanked (Porteous, 2006). However, like most literature on ICT for development remarkably little theoretical and empirical research has been done to determine why individuals and society consume such services, and the impact of the individual's interactions with the technology of the society's values and norms (Duncombe & Boateng, 2009). The purpose of this study is to understand the processes that shape the adoption and consumption of technology, but in so doing seek an understanding of what the technology and its services mean to people, how they experience it, and the role that it plays in their lives. Thus, the research question for the study is "How do individuals in Kenya domesticate mobile money into their everyday life and how does that affect the social practices of its communities? To answer the research question, we conducted a series of focus group discussions, unstructured interviews and number of participatory observations of service usage focusing on individuals from the Machakos District of Kenya.

In this paper, we report on the effect of mobile money services on the social practices of money in Kenya with emphasis on rural adopters using the domestication approach. The domestication approach considers consumption rather than use, and views adoption as a process rather than an event (R. Ling & Thrane, 2002) We apply the dimensions of the domestication approach (appropriation, objectification, incorporation and conversion) to try to explain how a Kenyan society adopted mobile money and to explore the implications of the mobile money technology to Kenyan's social practices. Both the user and the technology interact in a social sphere as social entities. The current research is based on the principle that the acceptance, use and adoption of new technology by an individual lead to an interaction between them that shapes both the technology and the individual's society. Thus, the impact of these interactions is bi-directional. Both the individual and his or her society and technology are affected by the interaction. Similarly, the findings of the current research indicate that the consumption and adoption of mobile money have shaped both the individual and his or her society and technology through the design of new services on the same platform. The findings illustrate the various social practices of money and the existing norms, which facilitated the appropriation of the mobile money services in Kenya. It also provides insight into how the mobile money technology affects the structures and routines of the individual's everyday life.

The paper shall proceed by considering the context of the research namely mobile phone and mobile money development in Kenya. Followed by a section on theoretical foundation, which explains the domestication approach, and how it can be used to explore the research objectives. Thirdly, the methodology used with an extensive description of the sample will be provided. This will be followed by the findings and then Discussions. The paper concludes with a section on conclusion and further research.

2. Context

2.1. Mobile Phones in Kenya

Kenya was not left out in the spread of mobile technology in Africa. Since its telecommunication liberalization in the 1990s, Kenya has enjoyed a steady growth of its mobile subscription base. The number of subscribers in Kenya exceeded 25 million in June 2011 representing over 64% of the total population (CCK, 2012). This characterizes a sharp increase from 2009 when the total

subscribers were reported being just over 16 million, enjoying a year-on-year growth of over 25%. As with most developing countries, the majority of the subscribers i.e. over 99% have prepaid subscriptions. The plummeting handset prices (current low price of $20) and the prepaid schemes are argued as the main factors that have instigated this growth in Kenya's mobile market. The use of prepaid schemes allows individuals to purchase small denominations of airtime credit. This is particularly convenient for the poor user since they can adjust the usage to suit their erratic patterns of income (Morawczynski, 2011).

There are currently four mobile network operators i.e. Safricom, Airtel, Essar Telecom and Telkom Orange. Safaricom has the largest market share of 68.6% followed by Airtel (14.3%), Telkom Orange (10.8%) and Essar Telecom (6.3%). The four mobile network operators have engaged in a battle for new customers and retention of existing ones, which has led to a reduction in prices and improved infrastructure (Morawzcynski, 2011). For example, in 2010, the Average Revenue Per User (ARPU) per month reduced to KES 348.94 from KES 389.00 in 2009 as a result of reduced calling rates (CKK, 2011). Further, the competition among the MNOs led to a quest to find innovative ways to retain customers and possibly increase revenue. One of such innovations is Mobile Money.

2.2. Mobile Money

As a mobile data service, mobile money is one of the newest form of services resulting from, the rapid spread of mobile technologies to be widely deployed in the developing economies. Since it was first launched as SMART Money in the Philippines, in 2003, at least 72 mobile money deployments have been launched across 42 developing countries (Mas & Radcliffe, 2010). The year 2010 alone saw 31 new mobile money deployments in 25 countries. Even though, mobile money has not been well defined in the literature, it can be said to refer to the provision of financial services through mobile devices and networks. Mobile money consists of a mobile application that allows users to access and manage an account, store value, check bank balances, transfer funds either to make payments or to an individual and conduct other financial services. In explaining the components of mobile money, (Gencer, 2011) separated it into mobile payments, mobile finance and mobile banking as shown in figure 1 below:

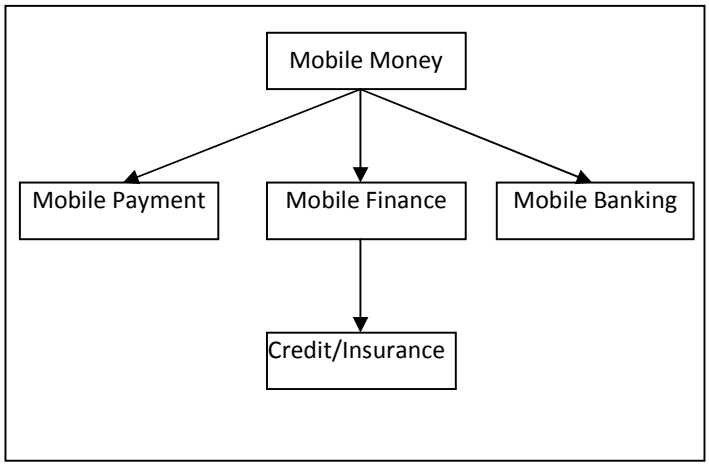

Figure 1: Mobile Financial Services

Most mobile money deployment started as a tool for person-to-person money transfer, then mobile payment including the purchase of airtime, and currently mobile banking and other financial services (Merritt, 2011). As posited by Jenkins (2008), there is no limit to the range of transactions and services that mobile money could eventually be used. The structure of the mobile money ecosystem is still evolving and may include far more services in the future. Currently, it can be used in supermarkets, for foreign remittances and to buy online tickets.

Safaricom launched the largest mobile money deployment in Kenya, M-PESA in March 2007. The initial product concept was to enable a mobile money user to use his or her mobile phone to move money quickly, securely and across a great distance to other mobile phone users who does not need to have a bank account (Hughes & Lonie, 2007). The focus of mobile money from Safaricom was to provide financial services to the unbanked. The demand for money transfer services between the urban migrants, and their poor rural households contributed to the growth of M-PESA. The success of M-PESA led to the deployment of mobile money by the other three mobile network operators. Airtel (formerly known as Zain) launched Airtel Money in 2009, which was followed by Orange and Yu, in late 2009 and 2010 respectively. The total number of registered mobile money subscriptions as at June 2011 was recorded as 17.3 million representing over 40% of the population (CCK, 2011 p. 9) and approximately 68% of mobile subscribers in Kenya. At the same time, total deposits made through the mobile phone were recorded at 48.2 billion.

Mainly developmental practitioners and a few researchers in the area (Duncombe & Boateng, 2009) have documented the use and impact of mobile money in Kenya. Morawczynski (2011)'s fourteen months ethnographic studies that included 350 interviews, 21 focus group discussions and financial diaries of mobile money users are so far the most comprehensive account of mobile money usage in the academic literature. The thesis and its accompanied papers give insight into how both the urban and rural users used mobile money in their everyday life. The findings indicated an increase in the household income of M-PESA users by between 5-30% and discussed inflow of funds between the urban users and their rural households (Morawczynski & Pickens, 2009). Other researchers have reported an increase in informal savings and impact on culture and societal norms (Rutherford, 2001; Wilson & Harper, 2010). Earlier research point out that although mobile money was originally to be transformational (bringing financial services to the unbanked), it is the urban wealthiest groups that were the early adopters of the technology. However, a recent study by Jack and Suri (2011) posits that poorer households with no bank accounts are getting on-board. Although the existing literature provides some insight into the use and adoption of this new phenomenon, a further understanding into how it has affected existing social structures and influenced the wider society using different analytical approaches like domestication is solely needed.

2.2.1. Mobile Money and Savings

Maurer (2012), explained the mobile money phenomenon as an empowerment of the rural unbanked. However, Mbiti & Weil, (2011), posit that although a significant number of survey respondents indicate that they use their M-PESA accounts as a vehicle for saving, their analysis of aggregate data suggests that the overwhelming use of M-PESA is for transferring money from individual to individual, with extremely little storage of value. Even when the M-PESA was not designed for the store of value, increasingly sophisticated consumer demand drove the development of new services (Dolan, 2009).

Adapting Prahalad (2010) concept of people at the "bottom of the pyramid", Ismail and Masinge identified the poor as people with incomes less than $32 per month.

Mas & Morawczynski (2009) posits that one of the key factors that made M-PESA successful was Safaricom's strong corporate brand and the simplicity of its message "send money home".

"Safaricom initially thought the service would be centered on micro credit repayments, but they reoriented it toward domestic remittances after monitoring transaction patterns during the pilot and assessing customer feedback".

2.2.2. Mobile money agents

Mas and Morawczynski (2009 p. 82) argues that the rapid adoption and use of Safaricom's M-PESA could be partly attributed to its tight control of the customer experience with the agents. The retail agent network form a significant part of the mobile money service, and their management is crucial in building trust in the platform and gives the consumer a consistently positive experience of the services. The agents are monthly monitored using scorecards. Further, the agent's working capital was identified as the single most important aspect of agent network management. The working capital is determined by having enough cash to meet customer request for cash-out and having enough value in the agent's M-PESA account to enable customers to make deposits. To manage this, the operator appoints agent aggregators or master agents.

3. Domestication of Technology

In the current study, we employ a sociological theory of domestication to analyze the consumption and impact of mobile money in Kenya. In a seminal work, by Silverstone, et al. (1992), an attempt was made to provide an integrative framework for the analysis of household practices and relations and consumption and use of information and communication technologies. This framework becomes known as the domestication approach, and referred to by others as the domestication theory (Hynes & Richardson, 2009). A fundamental aim of this approach is to provide insights into the surrounding social processes involved in adoption and consumption (R. Ling, 2002). Domestication, described as a process of technology consumption where the consumer and technology are actively involved in transforming each other through their interactions (Silverstone, 1994). Where active consumption means, the "negotiations and re-negotiations in consumption", which transforms both the consumer and the technology (Silverstone, 2006). Thus, domestication approach provides a departure from the deterministic focus of technology acceptance and diffusion of innovation research by putting emphasis on technology as a social artifact thereby extending technology adoption to a stage where it is embedded in the society. It emphasizes the

"social construction of technology" where the consumer is perceived to influence the nature, scope and functions of the technology (Ward, 2006).

The emergence of new technological innovations requires users to accept them as relevant and useful in their everyday life (Silverstone, 2005). Domestication, thus, focuses on the technology consumption in an individual's everyday life. When the domestication has been successful, the service is no longer regarded as a strange, frustrating and difficult consumer service, but reliable and trustworthy.

More specifically, it provides an understanding of what technology means to an individual and what role it plays in their life (Haddon, 2003). As posited by Silverstone:

"By domestication I mean something quite akin to the domestication of the wild animal... a process of taming or bringing under control. Technologies, television and television programs must be domesticated if they are to find a space or place for themselves in the home" (Silverstone, 1994: 83).

The extent of the process of taming depends on the history of the technology and on the expression of the subjectivity of those who are involved, as explained by (Hirsch, 1992). For example, domesticating mobile phones to an urban dweller that is used to telephony is not as a complex process as it is for a rural person who has no concept of telephony. Perhaps, the subjectivity of the rural dweller demystifies the perceived transformation that is required for the domestication to take place (Silverstone, 1994 p. 98). Although, initially, domestication is presented as the taming of the technology, it could also be perceived as taming the individuals and the households involved. The readjustments, negotiations and power plays that are invoked at the appearance of the technology described by Silverstone (2006) involve some sort of the taming of the household by the technology (p. 234-235). Thus, domestication is used to find the crossover where technologies and people adjust to each other and find a way to co-exist (Hynes and Richardson, 2009). Therefore, the history of both the technology and individuals should be considered to provide a better understanding of the individual's adoption process (Silverstone, 1994 p. 98). However, the significance of these biographies is apparent at the very early stage of the domestication process; the stage where meanings are constructed either through design from

the developer's perspective (Silverstone, Haddon, In Silverstone, & Mansell, 1996) or the biographies of its consumers.

From its humble beginning of consumption of media in the household (Haddon, 1998) the use of domestication perspective has transcended the household into multiple spheres of social life (Haddon, 2006). For example, domestication research has studied differences in adoption and use of mobile services in work and leisure contexts. Also, in different contexts represented by demographic variables such as age (young versus other users) and gender (female versus male users), in contexts of private and public use, and in the dynamic contexts represented by multiple and changing roles of modern technology users (Green et al., 2001; Harwood, 2011; Wellman, 2001). Pierson (2005) applied the domestication approach in the study of domestication at work in small business while Ward (2006) focused on the use of the Internet. The level of analysis has also extended from the household or "home" to the individual identity (Hartmann, Berker, Punie, & Ward, 2005)

3.1. Key Assumptions

Haddon (2003) identifies five key assumptions to the domestication perspective. First, domestication differentiates use from consumption; thus it is more about the individual's meanings and experiences placed on the use of the technology. These meanings of the technology are derived either from the marketing or wider media discussions or from what others have said about them. In order to provide a better understanding of adoption and use we need to appreciate the interactions and negotiations that lead to use. Thus, consumption considers the roles that technology assumes through these interactions and negotiations even after acquisition. Secondly, domestication adopts a process approach to adoption. Similar to the diffusion of innovation adoption process, domestication perceives adoption to begin with the individual imagining the role of technology in their daily life and the negotiations around its acquisition. The perceptions about the technology could either lead to either a purchase decision or a rejection decision. Once acquired, the process of identifying appropriate usage of technology in the individual's everyday life begins. Such incorporation could include considering its fitness in the individual's personal and societal norms and values. Thus, existing routines and structures need to be negotiated, for the new technology to fit in the individual's daily activities and other relations (R. S. Ling, 2004). This

process may lead to only an initial use of the technology never to be used again. It may also lead to several re-negotiations of routines, creation of new routines and changes to its placement -both physically and temporally.

The third assumption discussed by Haddon was that domestication is not a one-off process. The dynamics of the society, home and the individual's own daily activities are not static, and their interactions may call for a re-assessment of the role of technology in the individual's daily life. For example, the role of mobile money technology in the life of a migrant worker may change significantly when he or she manages to relocate the family to his or her present location. There are temporal changes to the importance and role of technology in the life of an individual. As society influences consumption and personal or household preferences and priorities, it reassesses the role of technology. In addition, it is noted that the taming of the technology is not always successful.

Fourthly, domestication views a three-way interaction between the individual, the technology and other individuals. Although, the focus is on the interaction between the end-user and technology, a considerable attention is given to that of others and the technology. The individual end-user's interaction can be viewed through the lens of the relationship between technology and other users (Ling, 2004 p. 28). Hence, domestication is more than an individual's mental calculation of how to use an artifact, but extends into social interactions between individuals with influential individuals and gatekeepers. For example, the use of the mobile money technology may depend on the availability of agents who also act as a support team for the mobile network operator. The relationship between the end-users and the agents is found to be significant in understanding the end user adoption of the technology (Merritt, 2011). Discussing the differences between technological determinism, social deterministic, affordances and domestication; Ling (2004) identifies this attribute of the domestication approach is what makes it a better analytical tool then the rest. He further posited that individuals express their own social identity through consumption.

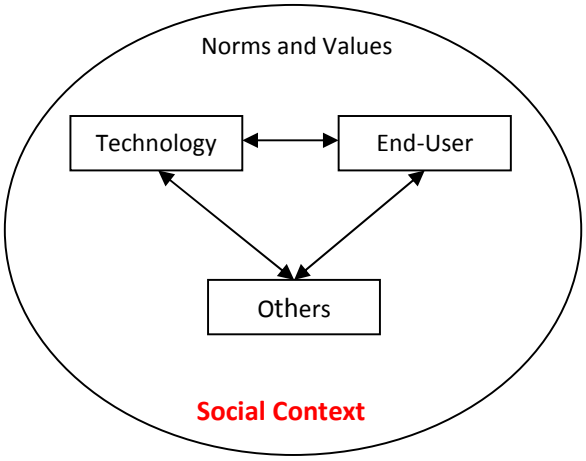

Figure 2: Technology and end-user interactions within a social context

Thus, in the domestication perspective, an individual's consumption of technology is also observed through the lens of other's consumption. The influence of others in the adoption process described by domestication is well investigated in the literature (see Haddon, 2004 p. 57).

Finally, Haddon posits that domestication assumes that end-users are not passive users of technology. Thus, the interaction between users and technology shapes both users and the technology. The experiences of the individual are not totally pre-determined by the technology. Individuals form new meanings to the technology over and above what its initial intentions. Thus, domestication provides a blend between the old technology determinism and social deterministic principles.

3.2. Dimensions of Domestication

Figure 3.5: The Domestication Process

The domestication perspective originally describes four steps in the adoption process (Silverstone and Haddon, 1996; Silverstone et al. 1992). These include *appropriation, objectification, incorporation and conversion*. These stages include the initial knowledge and awareness that leads

to the usefulness and other attributes of technology, to its purchase and eventual incorporation into daily life. Finally, the process describes how the technology becomes externalized as part of social profile (Ling, 2004 p. 28). Thus, domestication begins at the developers' workshop where certain public meanings are being associated with the technology in the formal market economy and ends at the stage where the consumer articulates his or her expressiveness of the technology used (Ward, 2006 p. 151). Later, the model was updated to include two additional moments (commodification and imagination) making it six. However, presented linearly in figure 3.5 above, Silverstone is careful to state that the stages of domestication, "can be considered neither discrete, nor necessarily as evenly present, in all acts of consumption (1994, pp. 123-4). In other words, the process is not necessarily entered sequentially, and it is possible for a person to objectify a product before going ahead to purchase (Ling, 2004). Although, the six moments were introduced in Silverstone (1994), to date most literature only uses the four stages identified in his seminal work (see Vuojärvi et al. 2010; Hynes and Richardson, 2009; Ling, 2004). Emphasizing on the initial phases described, we will still like to explain a fifth moment, the commodification, because of its significance and emphasis especially expressed in his more recent work, Silverstone (2006).

3.2.1. Commodification

The transition or translation of meanings has an object move from the public sphere into the private sphere of the individual or household and vice versa is the heartbeat of the domestication approach. These moments are what is referred to as commodification. From the developer's workshop to the market place, an object or service is given functional, aesthetic and symbolic meanings. It is these meanings that define them as products with attributes that expresses values and ideals of its societies and lead to the beliefs that a consumer creates about the product (Silverstone, 1994). These meanings embodied in the products design and marketing, referred to as formal economy, defines, the various uses of the product or service (Silverstone and Haddon, 1996). As the product goes through the trajectory of the domestication moments in consumption, the negotiations and adjustments in the private sphere create or translate new meanings, which are expressed in the public sphere of the developer's workshop and in marketing the product. Hence in domestication, consumption is seen as cyclical with commodification as the axis (Silverstone, 2006). Thus, through the commodification phase, domestication perspective moves

beyond the linear adoption models (e.g Roger's S curve) to view consumption as a cycle of transitions and translations of meaning from the formal economy to the moral economy and vice versa.

3.2.2. Appropriation

Appropriation is the moment when the product leaves the public sphere into the consumer's private sphere; from the formal economy to the private economy. This moment is bound with symbolic interpretations of the product or service. It is the moment when the consumer evaluates the attributes of the product or service and constructs it as either an object of desire or something they do not want (Hynes & Rommes, 2006). Quite similar to the attitude formulation stage of the social psychological theories or the awareness stage of the diffusion of innovation adoption decision process. Whereas certain authors have noted that the studying of the appropriation moment is redundant for non-domestic situations (see Hynes and Rommes, 2006 pp. 128) we think that it is extremely crucial when it comes to the study of the individual consumer. It is at the appropriation moment that the consumer gains the sense, through marketing, friends or family of how the product could somehow fit into his or her life.

3.2.3. Objectification

This could be referred to as the physical disposition of objects in the spatial environment of home. At this moment, the object of domestication finds a space in the moral economy. The presence of a new object in the private sphere calls for negotiations for physical space. Silverstone et al. (1992) argues that the eventual positioning of the object in the private sphere objectifies the values and sense of aesthetic towards the object (Bakardjieva, 2005). This is seen in the positioning of television in the homes (Silverstone, 2004). In domesticating a service, the role of the objectification moment becomes quite redundant. However, it could be argued that the objectification of a service should be seen from the space given to the object that carries the service. For example, in the objectification of the internet, an attention could be given to the physical location given to the computer as in Ward (2006 pp. 137). Further, Silverstone (1994) posited that objectification is not confined to material objects and that services can be objectified in the talk of the household and news events that provides the basis for identification (pp. 129).

3.2.4. Incorporation

Incorporation is the actual use moment of the domestication approach. The fundamental reason for appropriating a technology is functional (Ling, 2004). Whilst objectification brings the object or service to gain an identity and physical presence in the home, incorporation describes the functions of the object over and above what is described in its literature (Silverstone et al. 1996, p. 21). It describes how the object finds a place into the routines of daily life. Thus, integration of an object or service into the temporal structures and rituals of everyday life is the beginning of the incorporation moment. In consumption, incorporation provides us with the ability to bring to practice both the designers meaning and the user's symbolic meanings that are over and above what the product is designed to do. An analysis of consumers' use of technology through the incorporation moment of domestication could provide insight into the determinants of the technology appropriation in the first place. It can also be used to predict the appropriation of future technologies with similar symbolic meanings. It is this moment that most of the negotiations and adjustments take place as the consumer integrate technology into the daily life.

3.2.5. Conversion

Conversion like the appropriation moment deals with a transition between the private and public spheres. Whereas appropriation moment transits the object from the public sphere (formal economy) to the private sphere (moral economy); the conversion moment does the vice versa. This is a boundary across which the artifacts and meanings pass as the individual and the household expresses their usage of the product in recognition of a status to the outside world (Silverstone, 2004). We recognize conversion as an output of consumption that serves as an input to the process for further consumption. This is where the consumer's meanings are expressed and through commodification becomes part of the public meaning of the future appropriations and versions of the product. In a later work, Silverstone (2006) sees commodification as a better framing of the appropriation and the conversion moments (pp. 233). According to Silverstone, consumption is expressive. The household and its individuals will display the knowledge gained, competencies and frustrations at this moment of the domestication process.

4. Methodology

The methodology adopted for the current study is interpretative. The exploratory nature of the study warranted a qualitative research method to capture the essence and meaning of the consumer experience in the use and adoption of mobile money. Given that the interested was in situated meanings of technology adoption to the consumer's everyday life, a domestication analysis was deemed appropriate (Haddon & Silverstone, 2006). Adapting the domestication approach, the aim is to examine the individual consumer decision making process that involves the acceptance, consumption and incorporation of a technology into their everyday life. In addition, is a data driven process where findings and themes are drawn directly from grounded experiences of the participants. The study aimed at studying the ordinary user and his or her ordinary usage of the technology within a social context.

As the interest lies in understanding individual consumer's experience in the mobile money adoption process, focus group discussions and face-to-face interviews were considered most appropriate. Previous studies have shown that focus group discussion is an acceptable methodology for studying innovative mobile services (Jarvenpaa & Lang, 2005). The use of open-ended questions in the group discussions allowed participants to explain, comment on and share experiences, attitudes, opinions, and beliefs, focusing on the consumer (cognition and emotions associated with consumption intentions). Focus Groups provide an opportunity to capture the meaning that consumers give to different aspects of the reality they live in through group dynamics and interactions. For example, (Dahlberg et al., 2008) posit that qualitative studies on adoption are needed to help reveal details of the adoption factors identified in previous research. This research method is employed widely in marketing and consumer behavior research, and applied in understanding consumer adoption of mobile payment by Mallat (2007). Compared with individual interviews, the group members are more likely to challenge each other's views, argue for or change their own views, and bring forward issues that are pertinent to them (Bryman & Bell, 2007). Focus groups thus reflect the process through which meaning is constructed in everyday life (Bryman & Bell, 2007) were, therefore, deemed as especially informative for the purposes of theory development in a new research area. The additional unstructured interviews and observations were used to validate the findings from the discussions, and to provide new perspectives to the

discussion from their individual point of view. Further, a visit to various agent kiosk and supermarkets was made to observe how individuals were engaging the mobile money services.

4.1. The Sample

The focus group discussions took place in Machakos and Mutituni (a 10mins matatu (taxi) journey from Machakos) all within the Machakos District. For the purpose of this study, Mutituni is considered as part of Machakos. Machakos is located 64kms South East of Nairobi, the capital city of Kenya. The people of Machakos are known as Akamba. Machakos is a district that covers an area of 519km² most of which is rural. Only 12km² of the district is urbanized. It is also a satellite town because of its proximity to Nairobi with a population of 143,274 people. Machakos has a number of financial institutions such as Barclays, Equity, Standard chartered, K-rep, Cooperative and Kenya commercial banks in the central business district. According to the poverty assessment carried out in 2000, 66.2% of Machakos population was classified as poor (Machakos 2010). This site was chosen because it was made accessible by the assistance engaged.

The majority of the people in Machakos district rely on agriculture and agricultural related employment with 70% having income from agriculture. There exist profound gender disparities in the provision of education, employment and finance. However, the success of the Akamba women mwethya (a self-help group) group is well documented in literature (Murton, 1999). Historically, dating as far back as the 1950s the mwethya groups led by their women leaders have proven to be an effective vehicle for social and economic transformation (Mortimore, 2008). They were used to assist each other in building terrace during periods of erosion when the men had travelled to work in the cities. However, the mwethya groups have shifted from exchanging labor into capital mobilization. The creation of these social networks is embedded in the social fiber of the Machakos community and is used as an insurance network. Currently, the majority of the residents of Machakos (both male and female) are involved in one or more mwethya savings and loan groups. However, because of the small amounts of savings involved, women usually dominate them. Members pool resources together in a rotational basis. They have served as an alternative to banks for many members of the Machakos community in their flexible schemes and nominal interest rates. All the market women and businessmen interviewed were members of at least one mwethya group.

There were three focus group discussions and six interviews conducted in this community. In addition, further observations of the use of the technology were made through interactions with mobile money consumers and agents in central Nairobi. In order to ensure that the participants were able to express themselves freely, a local dialect was used in some of the discussions and interviews. Two assistant researchers were engaged to provide translation and recording support. The six interviewees were openly recruited from the market. The focus group discussions and the semi structured interviews were recorded, and at the conclusion of each session, the researchers transcribed the video discussions verbatim. During the transcription process, the researchers noted concepts, which were repeated across the groups, allowing for the identification of common themes. First, data were coded into broad categories and each category was then analyzed for evidence of the general concepts of domestication of technology.

4.2. Description of Participants

The first focus group was made up of a group of choristers from the Machakos Catholic Church hereafter referred to "Machakos Choir". Being members of an existing group helped in the group dynamics and fostered beneficial interactions between the participants. The Machakos Choir focus group was made up of 25 participants with only 50% actively involved in the discussion. They constituted 65% female and 35% male with income ranging from 2000 KSH (23USD) and 15000 (178USD) per month. They were a combination of farm owners, mechanics, secretary, plumbers, casual laborers and petty traders. The majority (70%) of the participants were users of Safaricom's M-PESA services with experience in all dimensions of the services. The second focus group discussion took place at a Mutituni chapel with 10 participants from the community.

Table 1: Description of Focus Group Participants

	Machakos Choir	**Mutituni Chapel**	**Machakos Bus Station**
Number of Participants	25	12	7
No. of Participants with Mobile Phone	22	10	6
No. of Participants with multiple SIM	12	5	5
No. of Participants with Bank Account	12	6	6
% of Participants who have used Mobile Money	90%	75%	85%
% of Participants who have used mobile money for topping up their credit	95%	75%	85%
% of Participants who have been refused a Bank Account	67%	45%	40%
% of Participants who have cash-in/cash-out - mobile money transfer	90%	75%	85%
% of Participants who have transferred money to and from their bank account	35%	38%	45%
Frequency of Use (Average)	At least twice daily	Everyday	At least once a day
Max. Amount transact using M-PESA (KES)	45000	10000	33000
Min. Amount transact using M-PESA (KES)	100	100	50

The Mutituni participants were made by a group of young people near the market place. They were aged between 15 and 22 years. Their experiences with the mobile money service were mainly as recipients of money, but sometimes made payments for relatives. About 70% said they knew their mothers' pin and only 10% knew their fathers' PIN. The last focus group discussion was conducted in a pub near the main Machakos bus station. Again, the participants were selected by sampling through open recruitment. However, Majority of the participants seemed to be regular customers of the pub and know each other. The existing relationship fostered interaction among the participants. There were seven participants made up of two male and five female. They were all currently working and claimed to be frequent users of mobile money.

5. Findings

5.1. Acquisition

As a value added service, the acquisition of mobile money requires an initial access and use of mobile phone device and network. The rapid spread of mobile phone use in the developing world has been a significant contributor to the extent of the mobile money phenomenon. About 86% of the participants own mobile phones, representative of ITU (2011) reportage. The remaining 14% reported having access through the sharing of a family member or neighbor's mobile device.

However, all participants have M-PESA mobile money account. The basic transaction underlying mobile money is the conversion of cash to electronic money and from electronic money to cash. It is in principle the purchase, transfer and sale of electronic money for the user. An initial registration is required to use the mobile money services. They then get an individual electronic money account, managed by Safaricom. A software application residing on the user's SIM enables the user to turn cash into e-money as a Safaricom dealer, and then follow a simple instruction to transfer the money to others (Huges & Lonie, 2007).

Thus, acquisition involves how the user came to know and use the mobile money services. From the discussions, there were three identifiable themes on how they came to know and accept M-PESA: media influence (adverts), social influence and simplicity of registering. The adverts, used by Safaricom, to promote M-PESA, had a simple, "send money home" value proposition, which strikes a chord with an existing social norm of domestic remittance (Morawzcynski, 2011). The aggressive promotion of M-PESA through billboards and radio and TV adverts contributed significantly in the individual acquisition of the service. These are some of the responses from the participants. "The M - PESA advert was good" "I saw the advert and thought it will help me" "When I saw the advert, I realized it would help me save money so I registered".

Further, the individual acquisition of M-PESA services was socially influenced; "Everyone was using it"; "my daughter recommended it from school"; "All my friends were using mobile money they use to call me names for not using it, so I got my phone registered" were some of comments from the participants. In addition, "I had to be sending money to my parents for a building project and they asked that I use mobile money". "Almost everybody I know uses mobile money, some mainly for buying credits on their phone, so I also used it" and "My next door neighbor is a mobile money agent, he explained how important it is to me, and I registered", are some of the socially influenced reasons provided by participants. Mobile phone and its applications are mainly social artifacts. The implication to the adoption of mobile services is that the interdependencies between an individual and his/her direct social neighbors have the most significant influence on the adoption and diffusion of the services (T. Beck et al., 2008). This was obvious in the case of mobile money's diffusion.

The simplicity of registration and use was found to be another significant influence on the acquisition of the mobile money services. Mobile money registration was free and effortless, requiring only a national ID, as against the rigorous documentation for a formal bank account (Donovan, 2012). Registration through a local agent including an initial training takes approximately 30mins. There is no minimum balance and users can send money to non-mobile money (Mas & Radcliffe, 2010). Mobile money was designed to be relatively easy to use because of its target of rural poor. The menu based user interface was found to be easy to use by even the rural illiterates among the participants. However, users find it difficult to use usually call on a relative, neighbor or a local agent to assist in their transactions. When asked, "what made the M-PESA easy for you to understand and use?", most respondents attributed their understanding to their use of top-up scratch cards. They explained that purchasing e-float is like purchasing airtime from the agent, except that for mobile money you can easily get your money back. A lady explained how she used airtime as her savings box before the emergence of mobile money. She purchases scratch cards and sells them when she needs some of her money.

5.2. Objectification

According to the domestication approach, an artifact or service is said to be objectified when it finds a physical place and a space within the daily life of the consumer (Habib, 2005). Mobile money has found a place in the everyday life of most adult users of mobile phone in Kenya. As a service, its spatial effect is based on the acquisition and use of mobile device and network. All new Safaricom SIM cards come with the mobile money application ready to be registered and used. It has found a place on most mobile handsets. Mobile money has been objectified. The findings from the discussions indicate that consumers are acquiring mobile phones and new Safaricom SIM cards just for the purposes of using mobile money. The value added service has become the main reason for acquiring the central service. A female participant at the Machokos bus station has this to say:

"My husband works in Nairobi, he comes home every other month. Initially, he did not want me to use a mobile phone because he says it will make me talk too much and neglect our children, but he sends money every week through a friend. One day the friend came with a phone already registered with M-PESA and my husband called and gave me the PIN code. Since then he has been using M-PESA to send me money and now I can also use the phone to make personal calls."

Thus, as in the words of Ling (2004 p. 29), "Objectification is the way in which an artifact comes to crystallize a sense of self.

5.3. Incorporation

5.3.1. Social Practices of Money

In diverse ways, the findings indicate how mobile money services have been incorporated into the everyday life of the people of Machokos and Kenyans in general. The purpose of conducting the focus groups was to engage the participants in a loosely structured interchange of discussion, in order to gain an in-depth understanding of how their consumption of mobile money services has affected their social practices of money. By social practices of money, we are referring to the individual's financial related, activities, which can be affected by the use of mobile money. This provides the pattern of consumption of the mobile money technology. Five key themes of social practices with money emerged from the data; they provide rich insights into changes in social practices, in money transfer (send and receive), spending, donation, store, save and loan because of the use of mobile money. Table 2 below, shows the various everyday social practices with money identified during the study with the average levels of frequency reported by the participants:

Table 2: Social Practices of Money

Social Practices with Money	**Average Frequency**
Payment of School fees	Quarterly
Visit to the Bank	3 times a week
Purchase of Airtime	Daily
Payments to mwethya groups	Bi-weekly
Transfer money to Family	Monthly/quarterly
Receive money from Family	Monthly/quarterly
Transfer money to extended family	Smaller amounts / monthly
Regular small donations	Daily
Offerings in Church	Weekly
General Shopping	Daily
Home foodstuff	Twice a week
Receive Salary /	Monthly/biweekly
Restaurant/Pubs	Daily
Payments to utility companies	Monthly
Transport	Daily
Carrying of cash	All the time
Taking a small loan from a friend/relative	Quite often
Emergency donations	Quarterly
Funeral/ Baby Naming/	Once a month

Carrying of cash	All the time

5.3.2. Savings

Income to poor people in most communities, in Sub Saharan Africa, is not distributed evenly throughout the year, and the participants were not exceptional. For those who are farmers, their income is concentrated at harvest time. The farm laborers and petty traders face the same fluctuation in their income throughout the year. However, the expenditures on most of the poor household necessities take place throughout the year. This does not stop the poor from seeking opportunities to save. As explained by Collins (2009) in his book "Portfolios of the Poor", most of the poor in these communities want to save money for emergencies to either their immediate or extended family. However, as discussed later, a major deterrence to saving is the social pressure to share, a phenomenon which is historic with the Akamba people of Machokos.

Finding a place to save is always considered. Many participants are members of multiple micro savings schemes. Female participants want to save money that is far from the reach of their husbands (Morawzcynski, 2011). They see the savings as a security against the disruptions in family life, for example, divorce, desertion or death of the husband. Some believe that the savings make them gain respect before their husbands. Other motivations for savings include: acquiring assets such as livestock ; grain; land; school fees; wheel barrow; motorcycle; birthdays; religious festivals; funerals; and weddings.

The key everyday activities involving savings identified by the participants included:

- Weekly/bi-weekly payments to multiple mwethya and other savings schemes. More than 75% of the female participants engage in multiple saving schemes.
- Giving money to friends for keeping
- Keeping money in the bank to avoid spending sporadically
- Keeping money in and around the home, sometimes too small to send to the bank

5.3.3. Money Transfer (Send and Receive)

The extant literature on mobile money indicates that money transfer is the initial motivation for many users of mobile money. However, discussions with the participants indicate that new users

are finding new reasons for using the service (Merritt, 2010; Morawzcynski & Pickens, 2009). Transfer money to other individuals or business involves shifting one's money. A commonly cited example being urban males sending money to rural female recipients - mostly recurring transfers for the purpose of income support and larger transfers used to address lump sum needs (Morawzcynski, 2011). Money transfer either to one's self (ME2ME), others (P2P) or as payments (P2B) was identified as the most used features of the mobile money service. About 90% of the participants rated money transfer as their most used mobile money services. However, there were indications that other usages like savings, payment of utility bills, donations and banking are rising steadily. Furthermore, participants' responses signify increase diversity in the money transfer services. Instead of the traditional periodic domestic remittance, mobile money is being used for everyday transfer of money, between friends, family (excluding remittance), colleagues and businesses. Participants from all the groups indicated an experience in the mobile money transfer.

"My husband sent money to me through M-PESA I was confused initially, but I gave it to an agent in our area who cashed the money for me. Now I understand it better and it's easy".

"My initial experience was through transferring of money to my brother in school. It was cheaper than my usual method of transferring money to him which was through the bus driver. I was surprised".

"A friend allowed me to use his M-PESA to send money to my sister at the Catholic University - it was simpler than I thought and quicker than my usual transfer from the bank".

"I realised that, I do not issue many cheques anymore; I found that instead of paying my bills, children's school fees and even taking cash from the bank by issuing checks, I have been using M-PESA mostly for all these transfers".

Mobile money users sometimes do transfer money to themselves from one mobile money services to another, for example, from M-PESA account to Airtel money account so that they can distance themselves from the money.

5.3.4. Donations

The lack of public safety nets to mitigate the advent of major problems means that people rely on personal resources such as savings, sale of physical assets and reciprocal exchanges to solve their own problems (Murton, 1999). When personal resources are exhausted because of the magnitude of the problem, they turn to extended families, friends, colleagues, neighbors or community for help. One of the main social practices of money in Kenya society today is the giving of donations and financial assistance. The practice of giving money to friends, relatives, children of friends to meet an immediate obligation upon request is an everyday occurrence. The act of giving is crucial to individuals who are expected to give cash all the time. The pressure to share cash to neighbors and family is considered to be pervasive throughout Africa (Goldberg, 2009). A respondent from the Machakos bus station told us that:

"My sister's problem is mine too, it is impossible for me to see a neighbor, say any of us here suffering and I have the money to help and not do it; it does not matter how much". Also, "giving to one another goes beyond our religion, it is our way of life, except that some have become greedy and do not help when you need their help"

Another participant from the Machokos Choir group stressed that:

"When you have cash it is difficult to deny a relative's or neighbor's request for money".

These statements show that, the moral identity of the Kenya society understudied is high and thus the desire to donate to out-groups such as beggars on the street could be hampered by the lack of cash. This may be quite disturbing for mobile money users who can no longer perform their desired social practice. Furthermore, this may partially explain why mobile money users would still like to carry some amount of cash. A participant from the Machokos chapel group told us that:

"Most of my uncles and friends of my parents who used to give me money when I meet on my way to school now uses mobile money as an excuse for not having cash on them, I, therefore, decided to get mobile money, but my dad will not allow me".

A participant, a waitress at a popular spot in Machakos said since their restaurant started allowing payments using mobile money, the amount of "tip" that they receive from customers has reduced considerably.

Key everyday social practices of money involving donations are:

- Funeral and child naming donations
- Small donations to children, nephews, nieces and neighbor's children
- Emergency support of family and relatives
- Offering in church and other social gatherings

The adoption of mobile money has the potential to affect the moral identity (giving to out-group) of the Kenyan society by reducing their tendency to share. Some of the participants stressed, that, they are quite reluctant to give if they had no cash on them. They are unwilling to transfer casual donations through mobile money and will only do that in an emergency. As explained by a participant in Mutituni Chapel; "giving in the church is usually spontaneous; having my money in an M - PESA account stops me from giving spontaneously". This remark led to a debate on whether or not spontaneous giving in the church is good. Relating it to the giving of alms, participants agreed that more financial assistance is done spontaneously, and not having cash does affect those all essential social norms. This probably explains the difficulties in raising funds using mobile money by various Islamic charities in Mombasa (Berman, 2011).

5.3.5. Spending

Another extremely fundamental aspect of participants' social practices of money is spent on the purchase of goods and services. Next to remittance, spending or purchase of goods and services using mobile money was a main objective of the introduction of the service. Mobile money's services enable a shifting of expenditures in time. The participants asserted that mobile money enables them to space out their spending which intends reduce their overall consumption in a month. They reported a significant reduction in sporadic spending and impulse buying. Charges on cash-out, and the limited number of shops that accept mobile money payments were identified as the main reason for the reduction in spending when using mobile money. Most of

the participants argue that they still cannot buy most of the general household necessities with mobile money. However, there are mobile money agents in most of the large supermarkets, so they are able to cash-out to pay for the goods. About 60% of the participants are anticipating a time when they can pay for most necessities with their mobile money. However, there are still instances where because of existing relationship the sellers allow payments with mobile money. We see this in the following comments from one of the participants from the Machakos Bus Station:

"I have been buying my groceries from the same store for a very long time, and sometimes I pay for the goods and ask one of my children to pick it for me"

"Most of my everyday expenses are too small for using mobile money"

"Most market women do not accept mobile money; some of them have had unpleasant experiences with transfers not going through"

"I use mobile money to pay for my electricity bill and to pay my personal tax bill; except my matatus, I use mobile money to pay for most of my expenses"

In a separate interview with the retailers at Machokos market, we noted that only one among five market women was prepared to accept payments with mobile money. Although they use mobile money for buying their goods from Nairobi, they only accept payments using mobile money from trusted customers. In the conventional cash system, the transaction between the buyer and the seller is based upon trusted social convention - cash. The acceptance of mobile money by the seller requires a social trust system based on trusted institutions like the central bank. Although the system has been around for more than five years, trust in the individual is affecting certain usage of the services. A further study into how elements of trust interplay in various uses of the mobile money services will be appropriate.

5.3.6. Banking

The provisions of store of value service, checking account balance and connection to conventional bank account for transfers to and from the accounts are the key banking features of M-PESA. Among the focus group participants, the avoidance of going to the bank and the

inaccessibility of the banks clearly dominated the discussion on the benefits of mobile money. The mobile money users with connections to their bank account treats the mobile money account like a traditional "petty cash account" with regular transfers from their bank account into the mobile money account. While all the participants have access to banks in Machokos, nearly 40% do not have a bank account. Those without a bank account attributed the lack of formal employment, not having enough money to bank, transportation cost to the bank and documentation has the reasons for not opening a bank account.

"I transfer money from the bank to my M-PESA all the time, when there is too much on my M-PESA I transfer to my bank account".

"It has reduced my movements to the bank; I used to visit the bank at least 3 times in a week, now I only go there to deposit cheques".

"Now I could avoid the long queues at the banking hall"

"I am a person with disability [blind], I have problems with how the bank deals with me when I visit, the person I deal with when I am at the bank is supposed to be up to date on the disability policies of the bank; but they are ignorant"

"M-PESA agents have more human face than the tellers at the bank"

Besides the resentments expressed by the participants on the services of the traditional banks, they all agreed that for larger sums of money and transactions they will prefer the banks. The participants with bank accounts in particular asserted that having a bank account is much safer and more reliable for larger transactions. When we asked, "For those without a bank account, do you think having a bank account is still necessary?" About 95% of the respondents shook their heads and responded yes:

"I use mobile money to hold small sums of money" for large money I prefer the bank"

"Banks are still necessary I only need mobile money to reduce the number of times I visit the bank and for the convenience"

"Mobile money does not give us any interest on our money, so for huge money, I will definitely save it in the bank"

"Although their services are unacceptable and mobile money provides me with much convenience I still trust the banks more than mobile money".

This leads to the discussion on the transformational ability of mobile banking (Morawzcynski & Pickens, 2009; Tobbin, 2010 p. 285). Although mobile banking has been heralded as transformational i.e. bringing financial services to the unbanked, its usage may be limited to small transactions. It is seen as a complimentary service rather than a substitution to the traditional bank. Even the rural unbanked would prefer traditional banking services when the transactions involve a certain amount of money. The claim that mobile money is transformational is only true to some extent.

5.4. Conversion

It became apparent during the study that being mobile money user increases an individual's status in the Machakos community. For example, a number of the participants claimed that their acquisition of the mobile money services was as a result of social pressure. Also, participants had a different meaning to the use of the mobile money technology. Almost everyone contacted during this study in Kenya have had a mobile money experience. Mobile money in Kenya is a national pride. All stakeholders in Kenya's telecommunication industry see the success of mobile money as significant. In addition, individual users were seen to engage in public conversations of its usage. Similar to other earlier reports, participants of the current study were found to be extremely surprised when informed that comparable solutions implemented in other African countries have not been well patronized (Berman, 2011).

5.5. Consumer Satisfaction

Another prominent theme identified in the discussions was "satisfaction". By satisfaction, we refer to the consumer's overall psychological state that reflects the evaluation of the mobile money services after use. During the study, participants appeared to have drawn upon their traditional experience of domestic remittance and the inefficiencies of the cash society when constructing their expectancies for the mobile money services. The satisfaction of mobile money users is

affected by their expectations, which are determined by their prior experience in mobile use, domestic remittance, banking and general P2P, and P2B money transfers. The ubiquitous nature of mobile money transactions provided a relatively advantageous service to the traditional methods of cash transactions. For example, many of the participants reported using *matatus* (a local minibus) that makes regular trips to their rural areas. Money is given to the driver, and the recipients meet the driver when the minibus passes through their area to pick the cash. *Matatus* are notorious for delays, unpredictable and subject to frequent breakdowns (Berman, 2011). In addition, the service was relatively expensive, usually about 10% the value of the remittance. Furthermore, users' prior experience of intermittent "network down" syndrome makes any delay in the money transfer services reasonable so long as it is within what has been experienced in their mobile usage.

All the participants were extremely happy with the mobile money services and see it as an integral part of their everyday life. When asked, "Do you lose network connection very often?" They answered "not often but sometimes it does for a long time, about one hour"; we then asked, does it truly frustrate you? Most of them answered "yes, but it is still better than what we had before mobile money". Thus, satisfaction is a function of expectation and performance while the expectation is determined by prior experience. The initial satisfaction in the use of mobile services is usually higher because of the low expectation placed on it given the low performance of existing social practices. As the service evolves, consumers' expectation will increase as their prior experience changes.

6. Discussions

The purpose of this study is to understand the processes that shape the adoption and consumption of technology, but in so doing seek an understanding of what the technology and its services mean to people, how they experience it, and the role that it plays in their everyday lives. The findings provide insight into how mobile money has shaped the social practices and certain norms of its consumers and how they have subdued the technology through consumption. There is no place where the analogy of domestication as the taming of wild animal becomes vividly clearer than the concept of mobile money technology to the rural unbanked. Cash to rural unbanked is life or survival and technology is certainly a wild animal. Domesticating mobile money technology is

therefore a process of taming the "wild animal" as described in the findings. The consumers' daily practices of money are negotiated and renegotiated continuously to make room for the introduction of mobile money (Silverstone, 2006 p. 234-235).

6.1. The conceptualization of mobile money through the domestication lens

From the findings of the current study, domestication is proven as a good systematic tool for analyzing the individual's adoption behavior as a process. The individual behavior in relation to its interaction with the mobile money service can be divided into three kinds of behavior i.e. Appropriation (acquisition), Incorporation (consumption) and conversion (adoption). The domestication approach discussed earlier covers all three aspects. The approach recognizes that an individual adoption of mobile money services is a process that begins with an appropriation of the service. It reveals that the individual's appropriation decision is influenced by the individual's own meaning of the technology besides the meanings provided by the designer through the technology's functionalities (Silverstone, 2006). As shown in the findings, whereas, Safaricom was introducing the service as a remittance or long distance money transfer service (the send money home campaign), some of the potential users perceived it as a savings box. Before the introduction of M-KESHO, Suri and Jack (2011)'s survey of 2000 Kenyan households found that 89% of the respondents used M-PESA, to save. The basic mobile savings and other savings related transfers (transfers to Mwengya) were meanings that were not captured as an intrinsic characteristic of the mobile money technology. Further, the findings revealed how readily the users are in expressing their usage of the technology; constructing an identity for the mobile money user. Thus, the users have an active role in both the mobile money usage and the structure of both the "meanings" and "identity" that the artifact brings to mind (Sorenson, 2006: 46).

The construction of these meanings is informed by the existing social norms and practices. First, the meanings from the designer's workshop communicated through Safaricom's media campaign "send money home" struck a chord with the societal norms and values of Kenyan migrant workers. Second, the individual's imagination of how the technology can positively influence their daily practices of money, which aligns with their personal norms and values influences their appropriation of the services. Interestingly, in Suri and Jack (2011)'s survey, it was found that the

early adopters of mobile money were educated, wealthy and banked users. These characteristics were contrary to Morawcyznski (2011) description of urban migrants of Kibera who were the targets of the Safaricom's advert. Thus, we argue that the individual's personally constructed

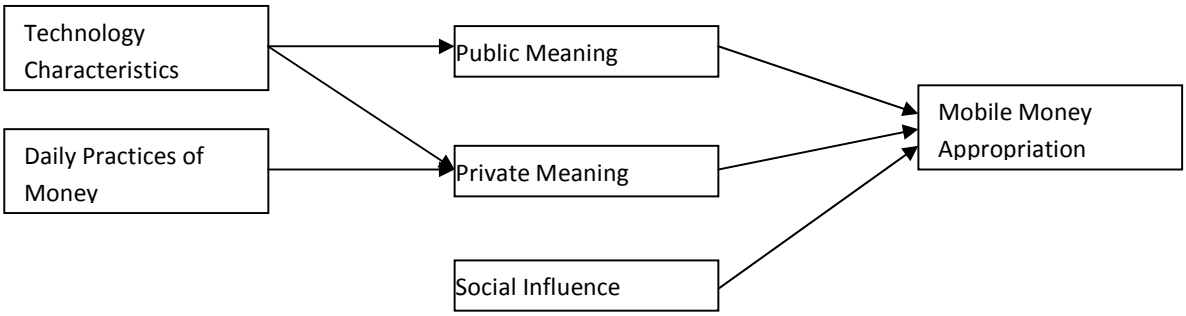

Figure 3: Mobile Money Technology Appropriation Model

meanings based on their daily practices and routines of money had greater influence on their appropriation of the mobile money services than the media influence. This supports Haddon's fifth key assumption of the domestication approach that end-users are not passive users of technology. The domestication analysis allowed the unpacking of the factors that affects the individual's internalization of the mobile money services that led to its appropriation. Therefore, it extends the Information Systems literature on technology acceptance (appropriation) which emphasize on the interaction between the individual and the technology that leads to the initial acquisition of technology. It usually concentrates on the cognitive, affective and social factors that influence the individual's acceptance of the technology. Applying domestication analysis, the mobile money technology appropriation is found to be influenced by the public meanings and the private meanings of the technology. Whereas the public meaning is solely determined by the technology characteristics, the private meaning is determined by the technology characteristics and the consumer's daily practices of money. This is illustrated in Figure 3.

The findings of the current study demonstrate that the consumer's appropriation of M-PESA was made possible by the designer's simplistic design of the acquisition and initial use of the mobile money services, in addition to other technological characteristics that formed its public meaning. Further, the individual's private meaning of the service, which is, in turn, influenced by both the characteristics of M-PESA and his or her daily practices of money. Finally, a number of findings points to the influence of the society on the appropriation of the mobile money services. The social

influence of spouses, agents, families and friends were all found to be significant in participants' appropriation of the mobile money services. The mobile money transfer services like most communication services require appropriation by parties involved in the transaction. Although, M-PESA allowed the transfer of money to an individual on different network or without M-PESA account, it attracted much higher transaction cost. This served as an incentive to build M-PESA's network of users. Thus, some consumers' appropriation of the technology was basically through the lens of others. To a number of the recipients of mobile money transfer, their appropriation and consumption of the mobile money services were through their families who sent the money.

The incorporation of mobile money involves the consumption (use) of the services in the everyday life of the individual. It involves embedding the mobile money service within all that constitutes a daily life. Here, the findings explicate the individual's "social practices of money" and how the intervention has led to negotiations of the daily practices and routines. It revealed the adjustments to daily practices that the individual engages in; to accommodate the mobile money services (Aune, 1996). It appears from the current study that mobile money is well incorporated into everyday life of most of the participants i.e. it has found a place in the structures and routines of the individuals' life. The most noticeable manifestation of this was the frequency of use i.e. daily. In addition, the response indicated a diverse usage of services, from the purchase of airtime, domestic money transfer, bank transfers and payment of goods and services. The extent of incorporation is determined partially by the degree of changes in existing social practices required by the introduction of the technology, and partially by the relative advantage of using the technology.

Contrary to the technology determinist's view of individual users as passive consumers, the findings of the current study indicate that the individuals' meaning of mobile money led to further development of technology to M-KESHO. The meanings and experiences of the individual in the use of the technology cannot be necessarily pre-determined or fixed as proposed by some quantitatively based models. Instead, the incorporation of mobile money into the individual's activities and routines, and thus the society, shaped and to some extent changed the everyday life of these individuals. The degree of the temporality of the service is dependent on the various meanings that the individual places on the technology. For example, if an individual sees the mobile money services as a "savings box", a medium of storing value, a payment tool, a medium for

domestic remittance and a means of buying airtime, then his or her degree of incorporation may be higher than where it is only seen as a medium of domestic remittance.

Constant adjustments are made as the configuration of the mobile money artifact changes (Harwood, 2011). The network coverage is still under configuration in most places of rural Kenya. Changes to network coverage, transactional cost and location and availability of agents, affect consumption patterns and the embeddedness of the service to everyday life. The consumers with bank integration reported continuous transfers between their bank accounts and their M-PESA accounts. As configuration changes, the individuals incorporation of the mobile money services can also change. There is no closure to the distribution of meanings and practices related to the artifact (Lie & Sørensen, 1996 p. 11).

In domestication approach, conversion phase is where the individual displays or expresses his or her consumption of the services publicly. At this phase, private use is made public. The consumption of the service becomes part of the individual's conversation. Mobile money is a buzzword in Kenya, and the use of mobile money for a person-to-person money transfer is well known by most people in Machakos. This is the true stage of adoption. Contrary to the existing IS literature on adoption and diffusion process, we propose that adoption should be described as the phase where the technology has become embedded into the everyday life of the individual. It is when the re-negotiations of meanings given to the technology by both the designers and individuals have become stabilized and the consumption of the artifact or service is taken for granted. For example, all participants and interviewees seemed surprised that mobile money is not being used in other countries with similar socio-cultural and economic characteristics. However, as discussed earlier, adoption as in the conversion phase should not be seen as a final stage in the adoption process.

6.2. Mobile Money and Savings

Central to the discussions of mobile money is its ability to bring financial services to the unbanked, and the findings of this research point to it. Although, M-KESHO, had been introduced at the time of this research, none of the participant reported using it. However, most participants were using M-PESA and other derivatives to store money. Basic mobile savings were found to be a key

application of mobile money aside money transfer. Participants' reported profound changes to their saving practices in everyday life. For example, a participant in Machakos choir indicated that M-PESA has enabled her to keep money away from her husband, kids and other children in her house. After the weekly shopping, she transfers all her surplus money into her M-PESA account. Nobody in her home knows she has an M-PESA account. It has also made her bargain extensive on the prices of the foodstuff in order to have surpluses to save. As a housewife, this has been her only opportunity to save. Five of the Machokos choir participants, said, they can make payments to their mwethya scheme through mobile money. Other participants said they stopped saving at the friends since they registered mobile money. Most of the men agreed that keeping money on mobile money has helped them manage their finances better and prevents them from sporadic buying. As more people engage in mobile money transactions, the social practices of savings will be shaped by the technology. This confirms Berman (2011)'s report on the usage of M-PESA in coastal Kenya that the trend of mobile money usage of the rural unbanked is to make regular savings some as little as 1USD daily.

Furthermore, traditionally, women were more likely to engage in small savings, but male users of mobile money have begun to use it as a tool to save small monies. Most men have found savings on mobile money convenient because they do not want to join the existing female dominated micro savings scheme. However, mobile money does not provide the insurance network and the provision of loans that exist in the micro savings schemes. It provides a safe and secure place to store money that does not require a setup or maintenance fees (Bryman & Bell, 2003).

6.3. Satisfaction

Although satisfaction is not a dimension of domestication, we argued from the empirical findings that the extent to which an individual will incorporate a technology into their everyday life depends on their continuous evaluation of how well it fits into his or her daily practices. Silverstone (2006), therefore, describes how people go through an enduring series of conflicts, negotiations and compromises over the location, ownership and control of technologies—as the technology has been temporally positioned into the already existing societal norms, routines and ways of doing things. The satisfaction derived from this evaluation is influenced by the individual's habit, norms, and relative advantage of the technology over other existing methods. The incorporation and

satisfaction phases will continue until the meaning of the technology stabilizes, and the technology becomes fully embedded into the individual's everyday life (Quandt & von Pape, 2010). At which stage the individual or society is in the conversion phase of the domestication of technology process.

7. Conclusions and Further Research

This article presents a number of contributions to how the consumer in its micro-societal environment accepts and consumes a mobile data service. First, it presents findings that provide empirical support that adoption can be best explained as a process, which includes an initial appropriation, consumption and adoption. However, instead of a linear process, it recognizes the link between the expressiveness of consumption that links adoption back to appropriation through commodification. Thus, providing empirical support for Silverstone's (2006, p. 243) argument that consumption is a cycle. Second, it supports Silverstone (2006) notion of moral economy and extends it to an individual's moral economy in a personal private context. Third, it shows the influence of social networks, daily practices, and norms, on all phases of the adoption process especially in the rural unbanked's adoption of mobile money context. To the best of our knowledge, this article represents the first application of the domestication approach to mobile data services. Although, Ling (2004) and Ling (2008)used domestication approach in analyzing mobile phone adoption they concentrated on the mobile phone as an artifact not as a service. Further, Pedersen (2005), (Nysveen, Pedersen, & Thorbjørnsen, 2005b) and other researchers apply aspects of the domestication approach to mobile data services. This is the first article that seeks to analyze the entire adoption process using the domestication approach. Finally, this article is an addition to the increasing number of studies using domestication as an analytical and theoretical framework. Further, it extends Silverstone fundamentals of media technology domestication and conveys the concept of domestication in an under-researched area.

The use of the domestication approach to explain how the mobile money technology has impacted the everyday life of the people of Kenya provides insight into the intricate processes, whereby, the individual assigns meaning and significance of the technology and how this is experienced by them during its acquisition and use. Where acquisition of the technology may be seen as one off, the findings and analysis has shown that the incorporation phase is a continuous process of re-

negotiations of meaning which is regulated by the individual's satisfaction in the consumption of the service. Thus, the domestication of mobile money in Kenya could be said to have reached the conversion phase, given that, individuals are prepared to express their usage in public and to negotiate societal status through its consumption. New friendships (e.g. Mobile money agents) is being formed, old relations (e.g. With Matatus drivers) are being broken and general social practices are being affected by the introduction of the mobile money technology. However, the process is not as linear, as individuals find new meaning to the mobile money technology; the technology will be further appropriated through commodification and then incorporated into their everyday life by changing certain social practices and then communicating to the public. Thus, in line with Silverstone's assertion, the findings indicate that commodification and conversion (the movement to and from the moral and formal economies) provide the shaping of the technology and the society (Silverstone, 2006). However, these interactions and effects of consumption require an organized system to communicate them to the designers' workshop. The mobile network operator agent is best positioned to perform this role. The individual's usage of the technology is also influencing the design and functions of the initial mobile money concept. Initially mobile money had no link to banks; the consumer's everyday routine of visiting banks and joining long queues shaped the technology and caused access to banks to be added. Currently one of the most significant uses of mobile money by the banked consumers is to transfer money to and from their bank accounts. Further, it is used to check bank account balances. This is a typical example of double articulation.

8. References

Aker, J., & Mbiti, I. (2010). Mobile phones and economic development in Africa. *Center for Global Development Working Paper*, (211). Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1693963

Aune, M. (1996). The computer in everyday life: Patterns of domestication of a new technology. *Making technology our own*, 91–120.

Bakardjieva, M. (2005). *Internet society: The Internet in everyday life*. Sage Publications Limited.

Beck, T., Demirgü\cc-Kunt, A., & Peria, M. S. M. (2008). Banking services for everyone? Barriers to bank access and use around the world. *The World Bank Economic Review*, *22*(3), 397–430.

Berman, M. S. (2011). The Development, Use and Cultural Context of M-PESA in Costal Kenya.

Bryman, A., & Bell, E. (2007). *Business research methods*. Oxford University Press, USA.

CCK. (2012). *Annual Report, Financial Year 2011*. Communications Commission of Kenya.

Collins, D. (2009). *Portfolios of the poor: how the world's poor live on $2 a day*. Princeton University Press.

Dahlberg, T., Mallat, N., Ondrus, J., & Zmijewska, A. (2008). Past, present and future of mobile payments research: A literature review. *Electronic Commerce Research and Applications*, *7*(2), 165–181.

Dolan, J. (2009). Accelerating the Development of Mobile Money Ecosystems. *Proceeding of MOBILE MONEY SUMMIT*. Retrieved from http://www.microfinancegateway.org/gm/document-1.9.50869/Mobile%20Money%20Summit%202009.pdf

Donner, J., & Tellez, C. A. (2008). Mobile banking and economic development: Linking adoption, impact, and use. *Asian Journal of Communication*, *18*(4), 318–332.

Donovan, K. (2012). Mobile Money for Financial Inclusion. *Information and Communications for Development 2012: Maximizing Mobile*, 61.

Duncombe, R., & Boateng, R. (2009). Mobile phones and financial services in developing countries: A review of concepts, methods, issues, evidence and future research directions. *Third World Quarterly*, *30*(7), 1237–1258.

Gencer, M. (2011). The Mobile Money Movement: Catalyst to Jump-Start Emerging Markets. *Innovations: Technology, Governance, Globalization*, *6*(1), 101–117.

Goldberg, L. S. (2009). Understanding banking sector globalization. *IMF Staff Papers*, *56*(1), 171–197.

Green, N., Harper, R., Murtagh, G., & Cooper, G. (2001). Configuring the mobile user: sociological and industry views. *Personal and Ubiquitous computing*, *5*(2), 146–156.

Habib, L. (2005). Domestication of learning environments in an institution of Higher Education'. *33rd Congress of the Nordic Educational Research Association, A Nordic Dimension in Education and Research, Myth or Reality* (pp. 10–12).

Haddon, L. (1998). Il controllo della comunicazione. Imposizione di limiti all'uso del telefono'. *Telecomunicando in Europa, Franco Angeli, Milano*, 195–247.

Haddon, L. (2003). Domestication and mobile telephony. *Machines that become us: The social context of personal communication technology*, 43–56.

Haddon, L. (2004). *Information and communication technologies in everyday life: A concise introduction and research guide*. Berg Publishers.

Haddon, L. (2006). The contribution of domestication research to in-home computing and media consumption. *The Information Society*, *22*(4), 195–203.

Hartmann, M., Berker, T., Punie, Y., & Ward, K. (2005). *Domestication of media and technology*. Open University Press. Retrieved from http://www.lavoisier.fr/livre/notice.asp?id=O22WA3ARLX6OWK

Harwood, S. A. (2011). The domestication of online technologies by smaller businesses and the "busy day." *Information and Organization*, *21*(2), 84–106.

Hirsch, E. (1992). *The Long Term and Short Term of Domestic Consumption: An Etnographic Case Study. V R. Silverstone in E. Hirsch (ur): Consuming Technologies: Media and Information in Domestic space: 208–226*. London: Routledge.

Hughes, N., & Lonie, S. (2007). M-PESA: mobile money for the "unbanked" turning cellphones into 24-hour tellers in Kenya. *Innovations: Technology, Governance, Globalization*, *2*(1-2), 63–81.

Hynes, D., & Richardson, H. J. (2009). What use is domestication theory to information systems research?

Hynes, D., & Rommes, E. (2006). Fitting the Internet into our lives: IT courses for disadvantaged users. *Domestication of media and technology*, 125–144.

ITU. (2011). *World Telecommunication/ICT indicators Database.* ITU. Retrieved from http://www.itu.int/ITU-D/ict/statistics

Jack, W., & Suri, T. (2011). *Mobile money: the economics of M-PESA*. National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w16721

Jarvenpaa, S. L., & Lang, K. R. (2005). Managing the paradoxes of mobile technology. *Information Systems Management*, *22*(4), 7–23.

Jenkins, B. (2008). Developing mobile money ecosystems. *Washington, DC: International Finance Corporation and Harvard Kennedy School*. Retrieved from http://www.hks.harvard.edu/m-rcbg/CSRI/publications/report_30_MOBILEMONEY.pdf

Lie, M., & Sørensen, K. H. (1996). *Making technology our own?: domesticating technology into everyday life*. Scandinavian University Press Oslo.

Ling, R. (2002). The diffusion of mobile telephony among Norwegian teens: A report from after the revolution. *Annals of Telecommunications*, *57*(3), 210–224.

Ling, R. (2008). Should we be concerned that the elderly don't text? *The Information Society*, *24*(5), 334–341.

Ling, R. S. (2004). *The mobile connection: The cell phone's impact on society*. Morgan Kaufmann Pub.

Ling, R., & Thrane, K. (2002). I don't watch TV to like learn anything. *First Monday*, *7*(1-7).

Mallat, N. (2007). Exploring consumer adoption of mobile payments – A qualitative study. *The Journal of Strategic Information Systems*, *16*(4), 413–432. doi:10.1016/j.jsis.2007.08.001

Mas, I., & Morawczynski, O. (2009). Designing mobile money services lessons from M-PESA. *Innovations: Technology, Governance, Globalization*, *4*(2), 77–91.

Mas, I., & Radcliffe, D. (2010). Mobile payments go viral: M-PESA in Kenya. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1593388

Maurer, B. (2012). Mobile money: Communication, consumption and change in the payments space. *Journal of Development Studies*, *48*(5), 589–604.

Mbiti, I., & Weil, D. N. (2011). *Mobile banking: The impact of M-PESA in Kenya*. National Bureau of Economic Research.

Merritt, C. (2011). Mobile money transfer services: The next phase in the evolution of person-to-person payments. *Journal of Payments Strategy & Systems*, *5*(2), 143–160.

Morawczynski, O. (2011). Examining the adoption, usage and outcomes of mobile money services: the case of M-PESA in Kenya.

Morawczynski, O., & Pickens, M. (2009). Poor people using mobile financial services: observations on customer usage and impact from M-PESA.

Mortimore, M. (2008). Links between ecosystem services and poverty reduction: situation analysis for arid and semi-arid lands in Eastern Africa.

Murton, J. (1999). Population growth and poverty in Machakos District, Kenya. *Geographical Journal*, 37–46.

Nysveen, H., Pedersen, P. E., & Thorbjørnsen, H. (2005). Explaining intention to use mobile chat services: moderating effects of gender. *Journal of Consumer Marketing*, *22*(5), 247–256.

Pedersen, P. E. (2005). Adoption of mobile Internet services: An exploratory study of mobile commerce early adopters. *Journal of organizational computing and electronic commerce*, *15*(3), 203–222.

Pierson, J. (2005). Domestication at work in small businesses. *Domestication of media and technology*, 205–226.

Porteous, D. (2006). The enabling environment for mobile banking in Africa. *London: DFID*. Retrieved from http://www.cab.org.in/ICTPortal/Lists/Knowledge%20Bank/Attachments/14/Enabling%20Environment%20for%20M-banking%20-%20Porteous_16_12_200749.pdf

Prahalad, C. K. (2010). *The fortune at the bottom of the pyramid: Eradicating poverty through profits*. Wharton.

Quandt, T., & von Pape, T. (2010). Living in the Mediatope: A Multimethod Study on the Evolution of Media Technologies in the Domestic Environment. *The Information Society*, *26*(5), 330–345.

Rutherford, S. (2001). *The Poor and Their Money, DFID*. New Dehli: Oxford India Paperbacks, Oxford University Press.

Samarajiva, R. (2005). Policy Commentary Mobilizing information and communications technologies for effective disaster warning: lessons from the 2004 tsunami. *New Media & Society*, *7*(6), 731–747.

Saunders, R. J., Warford, J. J., Wellenius, B., & Bank, W. (1983). *Telecommunications and economic development*. World Bank Washington, DC.

Silverstone, R. (1994). *Television and everyday life*. Routledge.

Silverstone, R. (2005). *Media, technology, and everyday life in Europe: From information to communication*. Ashgate Pub Limited. Retrieved from http://www.google.com/books?hl=en&lr=&id=dZRh3BKwFzIC&oi=fnd&pg=PR7&dq=domestication+silverstone&ots=kXEywPwlFW&sig=bs1nPUfajn3VkWpEI3brHgFjO84

Silverstone, R. (2006). *Domesticating domestication: Reflections on the life of a concept*. Open University Press. Retrieved from http://eprints.lse.ac.uk/id/eprint/9526

Silverstone, R. (n.d.). Eric Hirsch, eds. 1992. *Consuming technologies: Media and information in domestic spaces*.

Silverstone, R., Haddon, L., In Silverstone, R., & Mansell, R. (1996). Design and the domestication of ICTs: technical change and everyday life. *Communicating by Design: The Politics of Information and Communication Technologies. Oxford: Oxford University Press. p44–74*. Retrieved from http://webfirstlive.lse.ac.uk/media@lse/WhosWho/AcademicStaff/LeslieHaddon/DesignandDomestication.pdf

Tobbin, P. (2010). Modeling Adoption of Mobile Money Transfer: A Consumer Behaviour Analysis. *Proceedings of the 2nd International conference on M4D Mobile Communication Technology for Development M4D 2010* (pp. 280–293). Presented at the Mobile for Development, Karlstads universitet.

Ward, K. (2006). The bald guy just ate an orange: Domestication, work and home. *Domestication of media and technologies*, 107–123.

Wellman, B. (2001). The persistence and transformation of community: from neighbourhood groups to social networks. *Report to the Law Commission of Canada*.

Wilson, K., & Harper, M. (2010). *Financial Promise for the Poor: How Groups Build Microsavings*. Kumarian Pr.